THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL LXXV

JANUARY-MARCH

* 1902 *

BOSTON
AMERICAN ARCHITECT AND BUILDING NEWS CO.
211 TREMONT STREET

HELIOTYPE

L.S. IPSEN, DEL.

S. J. Parkhill & Co., Printers
Boston, U. S. A.

INDEX TO VOLUME LXXV.

JANUARY — MARCH, 1902.

Abingdon, Berkshire, Eng., 12

ACCIDENTS: —
Fall of Buildings in Detroit, 34
Rockslip in the New York Subway, 98

Accidents in Building. Common, 77
Action of Wind and Water on Sea cliffs, 22
Adams on Value of Public Art. Brooks, 65
Advantages of Dealing with large Constructing Firms, 41
Aërial Navigation. M. Santos-Dumont's Progress in, 58
Afridi Wax-cloth, 72
Air and Light Rights. New York Owners protecting their, 90
Albert Memorial, London. The, 8
Allston. Washington, 7
Altar of Sculptured Marble not admitted as a Work of Art, 49
Alumino-thermic Welding, 71
American Vignola. The, 11
" Window Glass Company. Doings of the, 26
Amphoras filled with Coins. Discovery of Roman, 16

ANECDOTE: —
Art in the Common Schools, 64
Ruskin and Newman Hall. John, 104

Anglo-American High Building in London. The proposed, 64, 72
Anticythera. The Hermes recovered near, 38
Antiques in Europe. False, 88
Antiquities seized by Custom-house for alleged Undervaluation. Imported, 26
Antiquity of Cuneiform Inscriptions, 39
Apartment-house Displacing the Single House in New York, 9
Applied Perspective. By W. P. P. Longfellow, 7
Arbitrament with a Penalty for Non-acceptance. An, 10

ARCHÆOLOGICAL: —
Armenia. Rare Finds in, 64
Arms of the Venus de Milo, 16
Baalbek. German Excavations at, 50
Babylonian Discoveries of the German Oriental Society, 48
Cuneiform Inscriptions, 39
Excavations near Cairo, 40
Excavations near Pompeii. Recent, 27
Excavations in Turkestan, 55
Hermes recovered near Anticythera. The, 38
Roman Amphoras filled with Coins, 16
" Forum. The Latest from the, 103

Architect of the U. S. Capitol. The Succession to the Office of, 33, 39
Architects invited to give Bond for satisfactory Execution of a Building-contract, 18
" Eligible for New York City Municipal Work, 57, 80
" and Owners. Trouble inflicted by incapable Subcontractors upon, 33, 41
Architect's Guaranty as to Cost of his Work. French View of, 18
" Right to Commission on Extras. An, 25
Architectural Effect of the Rue de Rivoli, Paris, 1
Architectural Engineering. By Joseph K. Freitag, 94
Architectural Expression. Use of Color in, 82
Architecture and Building. A Dictionary of. By Russell Sturgis and others, 36
" *on the Comparative Method. A History of.* By Prof. Banister Fletcher and Banister F. Fletcher, 37
Architecture in England. Early Renaissance. By J. A. Gotch, 6
Architecture in England during the Middle Ages. Domestic, 28, 52, 91
" An English Jeer at our, 72
Architecture in Italy. A History of. By C. A. Cummings, 61
" *Story of.* By P. Leslie Waterhouse, 95
Armenia. Rare Finds in, 64
Arms of the Venus de Milo. The, 16
Art-commission. New Members of the New York Municipal, 10
Art in the Common Schools, 64
" The Cross in, 59
" in French Toys, 64
" Gallery. Proposed National, 51
Art of Illustration. The. By H. Blackburn, 70
Art. Thoughts suggested by Address of Brooks Adams on the Value of Public, 65
Art-treasures. Cataloguing the Papal, 88
" Difficulty of disposing of Italian Family, 72
Artist unprotected in his Copyright. The English, 32
Artists' Protest against the Tariff on Works of Art, 79
Artists and their Work. The German Emperor and certain, 2
Asphalt-rock Pavement, 48
Assembly-hall needed in Washington, 25
Automatic Sprinklers for Hotels and Houses, 90
" " and Muddy Water, 40
Avignon, France. The Walls of, 104

— B —

Baalbek. German Excavations at, 50
Babylonian Discoveries of the German Oriental Society, 48
Balloon. Possibilities of M. Santos-Dumont's, 58
Beaux-Arts Prizes. French Artists, of either Sex, may compete for the, 34
Bequest to the Louvre. The Thiéry, 101
" " Pennsylvania Academy of Fine-Arts. Cresson, 64
Bierstadt, Landscape-painter. Death of Albert, 74
Billiard-table. An ancient, 80
Blasting. City Contractor's Liability for, 48
Block? What is a, 96
Bogus Antique Tapestries, 8, 32
Bologna's Leaning-tower in Danger, 8
Bond required of Architect for satisfactory Execution of a Building-contract, 18
Borghese Collection. The Villa, 15
" The Villa, 8

BOSTON: —
City-hall. Matter of a new, 17
Museum of Fine-Arts. Additions to Collections of the, 66
Retirement of General Loring, Director Museum of Fine-Arts, 90
Street Nomenclature in East Boston, 88
Teamsters' Strike. The, 82, 89, 94
Westminster Chambers Case again, 57

Brick. Discoloration of, 16
Bricklaying. Speed of British, 42
Bridge Arch in Luxemburg. The new Stone, 41
" Painting the Forth, 16
" over the Seine at Paris. Proposed new, 101
" at Zanesville, O. A Three-way, 80
Brown, Painter. Death of J. Appleton, 34
Building Commissioner of New York asks Aid of N. Y. Chapter, A. I. A., 1
" Common Accidents in, 77
" Examiners. The N. Y. Board of, 34
Buildings. New York's most valuable, 72
Bust of Queen Victoria. Romantic Recovery of a, 48
Busts of Members of the Institute of France, 104

— C —

Cairo. Excavations near, 40
Canal. Tunnelling a Venetian, 104
Canals of the World. Great, 47
Cape Cod Sandbanks. Controlling the Shifting, 32
Capitol. The Succession to the Office of Architect of the U. S., 33, 39
Carnegie's Gifts. Andrew, 71
Carpeaux's Models, 32
Cataloguing the Papal Art-treasures, 88
Catalpa Trees planted by the Illinois Central R. R., 88
Cathedrals one will never see. The, 5
Causes of Fires. Common, 22
Cement-concrete: Its Effect upon Steel Frame work, 17
Charleston, S. C., Exposition. The, 65

CHICAGO: —
Chicago-River Tunnels, 56
Coal Teamsters boycott Natural-gas Consumers, 41
Height-limit, 49, 51
Land Swindles in connection with the Exhibition, 58
Letter from, 51
Office-building Undertakings. New, 51

CHICAGO: —
Our Lady of Sorrows, 51
Post-office. Progress on the, 51
Stadium. The, 51
"Skyscrapers." Opposition to, 48
Union League Clubhouse. The, 51

Chigi Fine. The Prince, 72
Chimney-flues a common Cause of Fire. Defective, 22
Chinese Emperor's Summer Palace. The, 99
" Emperors. Proposed Railway to the Tombs of the, 66
Church Hygiene, 80
Church. Monuments of the Early. By Walter Lowrie, 62
Church, Wash., D. C. The Foundry, 80
Citizens' Health. N. Y. Supreme Court on safeguarding the, 24
City-hall, Boston. Matter of a new, 17
Clark, Architect. Death of Edward, 17
Cleveland, Ohio, Group Plan. The, 18, 104
Coal-teamsters in Chicago boycott Natural-gas Consumers, 41
Code of Ethics of Master-builders. The, 33
Collection. The Villa Borghese, 15
Color in Architecture. Renewed Movement in France toward, 82
Coloring of Metal. Galvanic, 8
Columbus Circle, New York. Arranging Surface-car Traffic at the, 9
Commercial Value of the Paris Exposition to Foreigners, 72
Commission on Extras. An Architect's Right to, 25
" for the Improvement of N. Y. City. Proposed, 49
" on the Improvement of Washington. Suggestions of the, 33
Common Accidents in Building, 77
Compartment-building as a Safeguard against Fire, 18

COMPETITIONS: —
Emblem for Louisiana Purchase Exposition, 18
Grant Memorial at Washington, 65

Concrete Court-house. A, 87
" and Iron Staircase. Rejection of a, 81
Congress of Workingmen's Dwellings. International, 82
Construction. Notes on Iron and Steel, 3, 19, 43, 67, 83
Consumption caused by Dust, 56
Contracting Firms. Advantages of Dealing with strong, 41
Contractor. Value and Usefulness of the, 2
Contracts. The Horgan & Slattery, 90
" of Indefinite Terminology dangerous, 10
Copyright Infringement, 16
" Law. The English Artistic, 32
Cornish Coast. The Action of Wind and Water upon the, 22
Corrosion or Non-corrosion of Steel Framework by Cement-concretes, 17
Cost of the Rhode Island State-house, 48
Court-house. A Concrete, 87

Cremation. Growth of Practice of, 40
Cresson Bequest to Pennsylvania Academy of Fine-Arts, 64
Cross in History and Art. The, 59
Cuneiform Inscriptions. Antiquity of, 39
Custom-house Seizures for alleged Undervaluation of Imported Antiquities, 26

— D —

Damage done by Locomotive Sparks, 82
Damage-suit in Iowa. Interesting Electrical, 40
Dante Monument at Rome. Proposed, 80
Decimal System Thirty-five Years after Legalization. Partial Use of the, 29
Decorations. Value and Interest of Mural, 10
Defective Method of Stone-setting in Paris, 50
Department-store Risk. The, 45
Despotism of Trade-unions. The, 63
Destruction of Rood-lofts, 88
Detroit. Fall of Buildings in, 34
Development and Improvement of Washington's Park System, 35, 75
Dictionary of Architecture and Building. A. By Russell Sturgis and Others, 36
Difficulty of disposing of Italian Family Art-treasures, 72
Dimensions of a proposed Monument. Empirical Way to determine, 88
Diminution of the Red-cedar supply, 95
Direct Employment of Labor, 2
Discoloration of Brick, 16
Discovery of Coin-filled Roman Amphoras, 16
Domestic Architecture in England during the Middle Ages, 28, 52, 91
Doors. Electroplating Wooden, 88
Draughtsman's Ring. A, 96
Dust and Consumption, 56
Duty on a Sculptured Marble Altar, 49
" " Works of Art. The, 74, 79
Dwelling-houses. Unduly high Insurance Rates upon, 73
Dynamos for Niagara. Gigantic, 64

— E —

Early Renaissance Architecture in England. By J. A. Gotch, 6
Eccentric Railways. Some, 96
Edinburgh. Stone and Wood Paving in, 56
Egypt to import Telephone Poles from U. S., 56
Elberfeld, Ger. Street-planning in, 98
Electrical-damage Suit in Iowa. Interesting, 40
Electric-lighting and Dust-destructor Works at Bermondsey, Eng., 96
Electroplating Wooden Doors, 88
Eligible Architects for practising in New York, 57, 80
Emblem for Louisiana Purchase Exposition. Competition for the, 18
Emperor William and certain Artists, 2
Emperor's Summer Palace. The Chinese, 99
Empirical Way of prejudging the Effect of a Monument, 88

ENGINEERING: —
Bridge Arch at Luxemburg. The new Stone, 41
" over the Seine. Proposed new, 104
" at Zanesville, O. A Three-way, 80
Canals of the World. Great, 47
Dynamos for Niagara. Gigantic, 64
Notes on Iron and Steel Construction, 3, 19, 43, 67, 83
Office-buildings. Modern, 86
Railways. Some Eccentric, 96
Steel-framed Buildings. The Life of, 89
Tunnel. Suggested Completion of the Hudson River, 34
Tunnelling a Venetian Canal, 104
Tunnels for New York. Five projected, 8
Wave-motor. A successful, 40

Engineering. Architectural. By Joseph K. Freitag, 94
Engines operated by Trolley-wires. Fire, 32
England alarmed by Exodus of Valuable Paintings, 56
" during the Middle Ages. Domestic Architecture in, 28, 52, 91
English Borough lighted by Garbage. An, 96
" Jeer at our Architecture, 72
Ethics of Master Builders. The Code of, 33
Examiners. The N. Y. Board of Building, 34
Excavations at Baalbek. German, 50
" near Cairo, 40
" " Pompeii. Recent, 27
" in the Roman Forum. The Latest, 103
" " Turkestan, 55

EXHIBITIONS: —
National Sculpture Society, 65

Exodus of Paintings to America. The, 56
Exposition. The Charleston, S. C., 65
Exposition. Commercial Value to Foreigners of the Paris, 72
" Emblem. Competition for Louisiana Purchase, 18
" at St. Louis and the Municipal Art Exhibit, 98
" Transplanting Trees for the St. Louis, 32
Extras. Commission on, 25

— F —

Fall of Buildings in Detroit, 34
False Antiques in Europe, 88
Farnesi. Parma, the City of the, 24
Fine-Arts. Additions to Collections of the Boston Museum of, 66
Fine for Counterfeiting old Tapestries, 8, 32
Fire. Common Causes of, 22
Fire-engines. Rouen's Trolley-operated, 32
Fire-loss for 1901, 1
Fire-protection in Department-stores, 45
" " Hotels, 81
Fire Safeguard. Compartment-building in London a, 98

FIRES: —
Park Avenue Hotel, 81, 97
Paterson, N. J., 73
Fixtures. Grates and Mantels are, 49
" Tenant's Right to remove, 56
Florentine Duomo and the Versailles Palace. The, 104
Ford, Sculptor. Death of Edw. Onslow, 1
Forest. A Tripolitan Petrified, 69
Forests as Producers of Oxygen. Value of, 2
Forged Pictures, 32
Forth Bridge, Scotland. Painting the, 16
Forum. The Latest from the Roman, 103
Foundry Church, Washington, D. C. The, 80
Fra Angelico. By G. C. Williamson, 70
French Academy at Rome. Early Days of the, 74
" Art Works. Suggested Law against the Sale to Foreigners of Ancient, 96
" Minister of Fine-Arts and Women in the Schools, 34
" Toys. Art in, 64
" View of Proposal that an Architect shall guarantee Cost of his Work, 18

— G —

Galvanic Coloring of Metal, 8
Garbage lights English Borough of Bermondsey, 96
German Discoveries in Armenia, 64
" Emperor and certain Artists, 2
" Excavations at Baalbek, 50
" Technical Schools, 14
Germanic Museum of Harvard University, 26
Germany. Artistic Street-designing in, 94
Gifts of Andrew Carnegie, 71
Glass as a Fire-protection. Wired, 81
" Manufacture. Movements in the, 26
" made Soluble, 48
Glastonbury Thorn. The, 87
Grant Memorial at Washington. Competition for the, 65
Grates and Mantels are Fixtures, 49
Great Canals of the World, 47
Group Plan. The Cleveland, O., 18, 104
Growth of the Practice of Cremation, 40
Guaranty of an Architect as to Cost of his Work. French View of, 18

— H —

Hall in Washington. Need of an Assembly, 25
Hand-book. The Print-collector's. By Alfred Whitman, 23
Harvard's Germanic Museum, 26
Health of Citizens. Safeguarding the, 24
Height-limit of Chicago Buildings, 49, 51
Hermes recovered near Anticythera. The, 38
Highway Work. Massachusetts, 64
History of Architecture: —
On the Comparative Method. A. By Prof. Banister Fletcher and Banister F. Fletcher, 37
In Italy. A. By C. A. Cummings, 61
History. The Cross in, 59
Holland House, N. Y. C., *vs.* City Contractor, 48
Horgan & Slattery Contracts. The, 90
Hotel Fire. The Park Avenue, 81, 97
" Guests from Fire. Protection of, 81
Hotels and Houses. Applicability of Automatic Sprinklers to, 90
House not a House? When is a fully enclosed, 26
Hudson River Tunnel. Suggested Completion of the, 34

— I —

Illinois Central R. R. planting Catalpa Trees. The, 88
Illustration. The Art of. By H. Blackburn, 70
Improvement in N. Y. C. Street-plan. Proposed, 49
" Scheme for Cleveland. Urban, 18, 104
" of Washington. Commission on the, 33
Improvements in Paris. Proposed Public, 50
Indefinite Terminology in Contracts dangerous, 10
Infringement of Copyright, 16
Institute of France. Portrait-busts of Members of the, 104
Insurance Companies and the Paterson Fire, 73
" Graveyard, 8
" Rates on Dwelling-houses. Unduly high, 73
International Congress of Workingmen's Dwellings, 82
" Edition in Quarterly Form, 1, 9, 18, 25
Iron and Steel Construction. Notes on, 3, 19, 43, 67, 83
"Islands" in Middle of crowded Streets. N. Y. Municipal Art League and, 66
Italian Family Art-treasures. Difficulty of disposing of, 72
Italy and Railroad Strikers, 64

— J —

Jeer at our Architecture. An English, 72
"Jerrybuilt," 56

— L —

Labor: Direct Employment of by Owners, 2
" Union coerces Users of Fuel-gas, 41
Landslip in the N. Y. Rapid Transit Tunnel. Damage caused by a, 98
Land Swindles in connection with the Chicago Exhibition, 58
Law against Sale of Ancient French Art Works to Foreigners. Suggested, 96
Lay Observers. The Misleading Recommendations of, 97
Leaning Tower in Danger. Bologna's, 8

LEGAL: —
Architect's Right to Commission on Extras, 25
Copyright Infringement Case. A, 16
Electrical-damage Suit in Iowa. Interesting, 40
Grates and Mantels are Fixtures, 49
Health of N. Y. Citizens. Safeguarding the, 24
House not a House? When is a fully enclosed, 26
Indefinite Terminology dangerous in Contracts, 10
Liability for Blasting. City Contractor's, 48
Owner's Responsibility for Payment of Provisional Sums, 70
Railway Suit against a Trade-union, 16
Stoop projecting beyond the Stoop-line, 104
Tenant's Right to remove Fixtures, 56
Westminster Chambers Case again, 57

Leighton's House declined. Lord, 64
L'Enfant's Letter to President Washington. Major, 46
Lessons to be drawn from the Paterson, N. J., Conflagration, 73
Letter from Chicago, 51
" " Paris, 101
" " Washington, 35, 75
" of Major L'Enfant to President Washington, 46
Liability for Blasting. City Contractor's, 48
Libraries. List of Carnegie, 71
Life of Steel-framed Buildings. The, 89
Light. Two Theories of White, 32
Lighting a Town by the Aid of Garbage, 96
Lightning. Nature of, 56
Liquid Glass, 48
Locomotive Sparks. Damage done by, 32

LONDON: —
Albert Memorial in need of Protection against Decay, 8
Anglo-American High Building. The, 64, 72
Leighton's House declined. Lord, 64
Rowton House. Rejection of Staircase in a, 81
Ruskin's Memorial in the Abbey, 85
Water-supply. Deadly, 8

Longfellow Statue for Washington. Proposed, 64
Loring, Director of Boston Museum of Fine-Arts. Retirement of General, 90
Louisiana Purchase Exposition Emblem. Competition for the, 18
Louvre, Paris. The Thiéry Bequest to the, 101
Luxemburg's new Stone Bridge Arch, 41

— M —

McKinley Memorial Schemes. The, 10
Manchester, Eng. Shops of Westinghouse Electric Co. built upon "American Principles" at, 42
Mantels and Grates are Fixtures, 49
Marquand, Amateur of Art. Death of Henry G., 73
Masonry in Paris. Defective Method of setting, 50
Massachusetts Highway Work, 54
Master Builders' Code of Ethics. The, 33
Memorial, London. The Albert, 8
" of John Ruskin in Westminster Abbey, 85
" Schemes. The McKinley, 10
Metal. Galvanic Coloring of, 8
Metric System. American Use of the, 29
Middle Ages. Domestic Architecture in England during the, 28, 52, 91
Milwaukee demands a Bond from Competing Architects, 18
Models. Carpeaux's, 32
Modern Office-buildings, 86
Monument to Dante at Rome. Proposed, 80
Monuments of the Early Church. By Walter Lowrie, 62
Mortgage Taxes in New York. Opposition to proposed, 25
Motor. A successful Wave, 40
Mount Vernon. Spotters on the Look-out for Vandals at, 32
Muddy Water and Automatic Sprinklers, 40
Municipal Affairs on the Decoration of Cities, 10
Municipal Art-commission. New Members of the N. Y., 10
Municipal Art Exhibit and the St. Louis Exposition. The, 98
" " League of New York and Street Refuges, 66
" Undertakings in Paris. Great, 101
" Work in N. Y. C. Bill to create Body of Architects eligible for, 57, 80
Mural Decorations. Value and Interest of, 10
Museum of Fine-Arts. Additions to Collections of the Boston, 66
" " " Boston. Retirement of General Loring, Director of, 90
" " Harvard University. Germanic, 26

— N —

Nassau County Court-house. The, 87
National Art Gallery. Proposed, 51
" Sculpture Society Exhibitions, 65
Navigation of the Air. M. Santos-Dumont's Progress in, 58

NEW YORK: —
Architecture of City. N. Y. Chapter A. I. A. asked to aid in Effort to improve, 1
Bill to create a Body of Eligible Architects for Municipal Work, 57, 80
Blasting. City Contractor's Liability for, 48
Building Examiners. Board of, 34
Buildings. Most valuable, 72
Columbus Circle. Arranging Surface-car Traffic at the, 9
Exhibitions of the National Sculpture Society, 65
Horgan & Slattery Contracts. The, 90
House not a House? When is a fully enclosed, 26
Improvement in Street-plan. Proposed, 49
Municipal Art-commission. New Members of the, 10
Owners of High Buildings protecting their Rights of Air and Light, 90
Park Avenue Hotel Fire. The, 81, 97
Rapid Transit Tunnel. Damage caused by a Landslip in the, 98
Shoe-manufactory settles Differences by Arbitration, with Penalty for Non-acceptance, 10
Single House displaced by the Apartment-house, 9
Sky Signs. Prohibiting, 42
Stoop-line. Projection beyond the, 98
Street Refuges. Municipal Art League and, 66
Tax on Mortgages. Opposition to proposed, 25
Tunnels *in posse.* Five, 8

Niagara. Gigantic Dynamos for, 64
Niches, 96
Notes on Iron and Steel Construction, 3, 19, 43, 67, 83

— O —

OBITUARY: —
Bierstadt. Albert, Landscape-painter, 74
Brown. J. Appleton, Painter, 34
Clark. Edward, Architect, 17
Ford. Edw. Onslow, Sculptor, 1
Marquand. Henry G., Amateur of Art, 73

Office-building Undertakings in Chicago. New, 51
Office-buildings. Modern, 86
Open-air Sanatoria in England, 42

Opportunities of Women in the French Schools of Fine-Arts, 34
Organ: Oldest in United States, 88
Our Lady of Sorrows, Ch cago, 51
Output of Southern Pine, 32
Owners of N. Y. High Buildings protecting their Rights of Air and Light, 90
Owner's Responsibility for Payment of Provisional Sums, 70
Oxygen. Value of Forests as Producers of, 2

— P —

Pacca Edict. The, 72
" Law suggested for France. A, 96
Painting the Forth Bridge, 16
" Value and Interest of Mural, 10
Paintings. Exodus to America of Valuable, 56
Palace of the Chinese Emperor. The Summer, 99
" " " Queen Mother at Rome. The, 22
Palermo's new Theatre. Real and Estimated Cost of, 79
Papal Art-treasures. Cataloguing the, 88
PARIS: —
Bridge over the Seine. Proposed new, 101
Carpeaux's Models, 32
Ecole des Beaux-Arts Prizes to Artists of either Sex. Opening, 34
Equitable Insurance Building. The, 101
Exposition. Commercial Value to Foreigners of the recent, 72
Letter from, 101
Masonry. Defective Method of setting, 50
Municipal Undertakings. Great, 101
Porcelain Tower for, 48, 82
Public Improvements. Proposed, 50
Rue de Rivoli. Architectural Effect of, 1
Thiéry Bequest to the Louvre. The, 101
Park Avenue Hotel Fire, New York, 81, 97
Park-system of Washington. Development and Improvement of the, 35, 75
Parma, the City of the Farnesi, 24
Paterson, N. J , Conflagration and some Lessons to be drawn from it, 73
Pavement. Asphalt-rock, 48
Paving in Edinburgh. Stone and Wood, 56
Payment of Provisional Sums. Responsibility of Owner for, 70
Pennsylvania Academy of Fine Arts. The Cresson Bequest to, 64
Perpendicular Domestic Architecture in England, 91
Perspective. Applied. By W. P. P. Longfellow, 7
Petrified Forest. A Tripolitan, 69
Picture-galleries. The Proper Policy for, 24
Pictures. Forged, 32
Pine Output. Southern, 32
Plan for the Architectural. Embellishment of Cleveland, O., 18, 104
Planning of new Streets of Elberfeld, Ger., 98
Poles to Egypt. Michigan to ship Telephone, 56
Policy for Picture-galleries. The Proper, 24
Pompeii. Recent Excavations near, 27
Porcelain Tower for Paris. A, 48, 82
Portrait-busts of Members of the Institute of France, 104
Post-office, Chicago. Progress on the, 51
Price of Window-glass. Threatened Rise in, 2
Prices held at Reasonable Level by U. S. Steel Company, 41
Print-collector's Hand-book. The. By Alfred Whitman, 23
Prizes of Rome. French Artists, of either Sex, may compete for the, 34
Protection of Hotel Guests from Fire. The, 81
Protest against the Tariff on Works of Art. Artists', 79
Provisional Sums. Owner's Responsibility for Payment of, 70
Public Art. Thoughts suggested by Address of Brooks Adams on the Value of, 65

— Q —

Queen Margherita's Palace at Rome, 22

— R —

Railroad Company to plant Catalpa Trees. Illinois Central, 88
" Strikers. How Italy deals with, 64
Railway Suit against a Trade-union, 16
" to the Tombs of the Chinese Emperors. Proposed, 66
Railways. Some Eccentric, 96
Rapid Transit Tunnel, N. Y. City. Damage caused by a Landslip in the, 98
Recommendations of Lay Observers. The Misleading, 97
Red-cedar Supply. Diminution of the, 95
Renaissance Architecture in England. Early. By J. A. Gotch, 6
Repentant Vandal. A, 32
Responsibility of Owner for Payment of Provisional Sums, 70
Retirement of General Loring, Director of Boston Museum of Fine-Arts, 99
REVIEWS: —
Applied Perspective. By W. P. P. Longfellow, 7
Architectural Engineering. By Joseph K. Freitag, 94
Art of Illustration. The. By H. Blackburn, 70
Dictionary of Architecture and Building. A. By Russell Sturgis and Others, 36
Early Renaissance Architecture in England. By J. A. Gotch, 6
Fra Angelico. By G. C. Williamson, 70
History of Architecture: —
On the Comparative Method. A. By Prof. Banister Fletcher and Banister F. Fletcher, 37
In Italy. A. By C. A. Cummings. 61
Monuments of the Early Church. By Walter Lowrie, 62
Print-Collector's Hand-book. The. By Alfred Whitman, 23
Romney. By Rowley Cleeve, 70
Story of Architecture. By P. Leslie Waterhouse, 95
Water and Water-supplies. By John C. Thresh, 31
Watteau. By Edgecumbe Staley, 70
Rhode Island State-house. Cost of the, 48
Right of Architect to Commission on Extras, 25
" " Tenant to remove Fixtures, 56
Rights of Air and Light. New York Owners protecting their, 90
Ring. A Draughtsman's, 96
Risk. The Department-store, 45
Roads of Massachusetts. Work on the State, 64
Rochambeau. Statue, in Washington, of, 36
Roman Forum. The Latest from the, 103
ROME: —
French School at the Villa Medici, 74
Good Name of the City and the Guide-books, 48
Monument to Dante. Proposed, 80
Palace of the Queen Mother. The, 22
Rome To-day, 53
Romney. By Rowley Cleeve, 70
Rood-lofts. Destruction of, 88
Rowton House, London. Rejection of Staircase in a, 81
Rubber Scrap. Utilizing, 104
Ruskin Memorial in Westminster Abbey, 85
" and Newman Hall. John, 104

— S —

Safeguarding the Citizens' Health, 24
Sanatoria in England. Open-air, 42
Sandbanks on Cape Cod. Controlling the Shifting, 32
Sandier and proposed Porcelain Tower at St. Cloud. M. Alexandre, 42, 82
SANITARY: —
Church Hygiene, 80
Consumption caused by Dust, 56
Rome's Good Name, 48
Sanatoria. Open-air, 42
Sewage-disposal System for a Country-house, 61
Ventilation. Transmural, 8
Water-supply. London's Deadly, 8
Santa Maria del Fiore and the Versailles Palace, 104
Santos-Dumont Airship. Future of the, 58
ST. LOUIS: —
Exposition and the Municipal Art Exhibit. The, 98
" Transplanting Trees for the, 32
Schools. Art in the Common, 64
" of Germany. Technical, 14
Sculptor. Paul Troubetzkoy, 48
Sculpture Society's Exhibition. The National, 65
Sea-cliffs. The Action of Wind and Water on, 22
Seine. Proposed new Bridge over the, 101
Sewage-disposal System for a Country-house, 61
Sherman. Proposed Statue for Washington of John, 64
Signs on Roofs in New York. Prohibiting, 42
Single House displaced by the Apartment-house in New York, 9
" Skyscrapers " in Chicago. Opposition to, 48
Sky Signs in New York. Prohibiting, 42
Smith on the Life of Steel-framed Buildings. General Sooy, 89
Sound. The Speed of, 32
Southern Pine Output, 32
Sparks from Locomotives. Damage done by, 32
Speed of Sound. The, 32
Sprinklers to Hotels and Houses. Applicability of Automatic, 90
" rendered useless by Muddy Water. Automatic, 40
Stadium, Chicago. The proposed, 51
Staircase. Rejection of a Concrete-and-iron Hanging Spiral, 81
State Highway Work. Massachusetts, 64
State-house. Cost of the Rhode Island, 48
Statue of Grant at Washington. Competition for the, 65
" " L'Enfant for Washington. Proposed, 104
" " Rochambeau for Washington, 36
Statues of Sherman and Longfellow for Washington. Proposed, 64
Steel Construction. Notes on Iron and, 3, 19, 43, 67, 83
Steel-framed Buildings. Gen. Sooy Smith on the Life of, 69
Steel Framework: Its Corrosion or Non-corrosion by Cement-concretes, 17
" and Iron. The Prices of Structural, 41
Stone Bridge Arch in Luxemburg. The new, 41
Stone-setting in Paris. Defective Method of, 50
Stone and Wood Paving in Edinburgh, 56
Stoop projecting beyond the Stoop-line, 104
Stores. Fire-protection in Department, 45
Story of Architecture. By P. Leslie Waterhouse, 95
Street Nomenclature in East Boston, 88
Street-planning by the City Engineer of Elberfeld, Germany, 98
Street Refuges. Municipal Art League of New York and, 66
Strike in Boston. The Teamsters', 82, 89, 94
Strikers. How Italy deals with Railroad, 64
Sub-contractors troublesome to Architects and Owners. Incapable, 33, 41
Subway. Rockslip in the New York, 98
Succession to the Office of Architect of the U. S. Capitol. The, 33
Summer Palace of the Chinese Emperor. The, 99
Swindles in connection with the Chicago Exhibition. Land, 58

— T —

Tapestries. Bogus Antique, 8, 32
Tariff on a Sculptured Marble Altar, 49
" " Works of Art. The, 74, 79
Tax on Mortgages in New York. Opposition to proposed, 25
Teamsters boycott Natural-gas Consumers. Chicago Coal, 41
Teamsters' Strike in Boston. The, 82, 89, 94
Technical Schools in Germany, 14
Telephone-poles for Egypt, 56
Tenant's Right to remove Fixtures, 56
Terminology in Contracts. Danger of Indefinite, 10
Theatre in Palermo. Real and Estimated Cost of new, 79
Thiéry Bequest to the Louvre. The, 101
Thorn. The Glastonbury, 87
Thoughts on Art, 65
Three-way Bridge at Zanesville, Ohio. A, 80
Tombs of the Chinese Emperors. Railway to the, 66
Tower of Bologna in Danger. The Leaning, 8
" for Paris. A Porcelain, 48, 82
Toys. Art in French, 64
Trade-union to contest Railway Suit, 16
Trade-unions. The Despotism of, 63
Transmural Ventilation, 8
Transplanting Trees for the St. Louis Fair, 32
Trees for the St. Louis Fair. Transplanting, 32
Tripolitan Petrified Forest. A, 69
Trolley-operated Fire-engines, 32
Troubetzkoy, the Sculptor. Paul, 48
Trust Methods applied to Washing, 50
Tuberculosis. Dust a Cause of, 56
" Open-air Treatment of, 42
Tunnel. Suggested Completion of the Hudson River, 34
Tunnelling a Venetian Canal, 104
Tunnels. The Chicago River, 56
" for New York. Five projected, 8
Turkestan. Excavations in, 55

— U —

Undervaluation of Imported Antiquities. Alleged, 26
Union League Club-house, Chicago. The, 51
U. S. Steel Company's Stand in the Matter of Prices, 41
Utilizing Rubber Scrap, 104

— V —

Valuable Buildings. New York's most, 72
Value and Interest of Mural Decorations, 10
Vandal. A repentant, 32
Venetian Canal. Tunnelling a, 104
Ventilation. Transmural, 8
Venus de Milo. The Arms of the, 16
Versailles Palace. The Florentine Duomo and the, 104
Victoria. Romantic Recovery of a Bust of Queen, 48
Vignola. The American, 11
Villa Borghese Collection. The, 15
" " purchased by Italian Government, 8
" Medici, Rome. The French School at the, 74

— W —

Walls of Avignon. The, 104
Washing. Trust Methods applied to, 50
WASHINGTON, D. C.: —
Assembly-hall. Need of an, 25
Competition for the Grant Memorial, 65
Foundry Church. The, 80
Improvement of the City. Suggestions of the Commission on the, 33
Letter from, 35, 75
National Art-gallery. Proposed, 51
Park-system. Development and Improvement of the, 35. 75
Statue of L'Enfant. Proposed, 104
" " Rochambeau, 36
Statues of Sherman and Longfellow. Proposed, 64
Washington Chapter A. I. A., on the proposed Change of Title of the Architect of the Capitol, 39
Water-supply. London's deadly, 8
Water and Water-supplies. By John C. Thresh, 31
Watteau. By Edgecumbe Staley, 70
Wave-motor. A successful, 40
Wax-cloth. Afridi, 72
Welding. Alumino-thermic, 71
Westinghouse Electric Co. builds at Manchester, Eng., upon " American Principles," 42
Westminster Abbey. Ruskin Memorial in, 85
" Chambers Case again before the Massachusetts Legislature, 57
White Light. Two Theories of, 32
Wind and Water. Action on Sea-cliffs of, 22
Window-glass Company. Doings of the American, 26
" Threatened Rise in Price of, 2
Wired Glass as a Fire-protection, 81
Women in the Schools. French Minister of Fine-Arts and, 34
Wood and Stone Paving in Edinburgh, 56
Work of Art. A Sculptured Marble Altar not a, 49
Works of Art. The Tariff on, 74, 79
Workingmen's Dwellings. International Congress of, 82

— Y —

Yuenmingyuen, the Chinese Emperor's Summer Palace, 99

— Z —

Zanesville, O. A Three-way Bridge at, 80

ILLUSTRATIONS.

[*The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation. The abbreviation "Adv." denotes that the illustration was published on an advertising page, common to both the editions.*]

APARTMENT-HOUSES.

Entrance to Apartment-house, New York, N. Y. D'Oench & Simon, Archts., 1364 (*Int.*)

BRIDGES.

Design for the Pont de la Monnaie, Paris, France. Ed. Berard, Archt., 1364 (*Int.*)

Pont Alexandre III, Paris: 2 Views, 1370 (*Int.*)

" de L'Alma, Paris, France, and Buildings of the Paris Exposition of 1900; Pont au Change and the Conciergerie, Paris, France, 1370 (*Int.*)

" des Arts and the Palais de L'Institut, Paris, France. M. Louis Levau, Archt.; Pont Neuf, Statue of Henry IV and the Panthéon, Paris, France, 1370 (*Int.*)

" de Garabit, Cantal, France: 2 Views, 1370 (*Int.*)

Prize Design for Bridge over the Rhine, Basel, Switzerland, 1364 (*Int.*)

Rope Bridge over the Kishanganga, Shardi, India, 1364 (*Int.*)

CLUB-HOUSES.

Club-house of the A. D. Club, Cambridge, Mass. C. K. Cummings and Parker & Thomas, Archts., 1367 (*Reg.*): —

Members' Entrance, 1367 (*Int.*)

Store Entrance, 1367 (*Int.*)

Fraternity House, University of Pennsylvania, Philadelphia, Pa. Chester Kirk, Archt., 1363 (*Int.*)

DETAILS.

Club-house of the A. D. Club, Cambridge, Mass. C. K. Cummings and Parker & Thomas, Archts.: —

Members' Entrance, 1367 (*Int.*)

Store Entrance, 1367 (*Int.*)

Details of the De la Montagna Mausoleum, Cypress Lawn Cemetery, San Francisco, Cal. B. J. S. Cahill, Archt., 1370 (*Reg.*)

Doorway of the Grand Palais, Paris, France. Entrance to the Ministry of the Colonies: The Tuileries, 1368 (*Int.*)

Entrance to Apartment-house, New York, N. Y. D'Oench & Simon, Archts., 1364 (*Int.*)

" " the Equitable Life Assurance Building, New York, N. Y. G. B. Post, Archt., 1361 (*Reg.*)

" " " Prudential Life Building, Newark, N. J. G. B. Post, Archt., 1365 (*Int.*)

" House of P. L. Ford, Esq., New York, N. Y. H. R. Marshall, Archt., 1369 *Int.*)

" No. 411 Commonwealth Ave., Boston, Mass. Little & Browne, Archts., 1360 (*Reg.*)

Interior Door: Hotel Manhattan, New York, N. Y. H. J. Hardenbergh, Archt., 1366 (*Int.*)

Marquetry Panels for the S. S. "Orontes." Designed by Stephen Webb, 1367 (*Adv.*)

Portal: Church of St. Radégonde, Poitiers, France; Portals: House of Jacques Cœur, Bourges, France, 1359 (*Int.*)

Transept Screen: St. Luke's, Germantown, Pa. G. T. Pearson, Archt., 1364 (*Reg.*)

U. S. Post-office, Creston, Ia. J. K. Taylor, Supervising Archt., 1369 (*Reg.*): —

Portico Details, 1369 (*Reg.*)

Vestibule: Château de Chantilly, France. Grand Stairway: The Sorbonne, Paris, France, 1368 (*Int.*)

DWELLINGS.

Additions to House of E. W. Clark, Philadelphia, Pa. G. T. Pearson, Archt., 1360 (*Reg.*)

Drummond Castle, from the South, 1358 (*Int.*)

Frimley Court, Surrey, Eng. F. S. Taylor, Archt., 1359 (*Adv.*)

(*Dwellings Continued.*)

Hatfield House, England, 1369 (*Reg.*)

Home of D. Z. Norton, Esq., Cleveland, O. C. F. Schweinfurth, Archt., 1366 (*Reg.*)

House at Aboyne, on the River Dee, England. J. M. Pirie, Archt., 1364 (*Int.*)

" on the Avenue Malakoff, Paris, France. M. Le Voisvenel, Archt.; House on the Rue de la Convention, Paris, France. M. Legriel, Archt., 1366 (*Adv.*)

" in the Rue Octave Feuillet, Paris, France. M. Arnaud, Archt., 1369 (*Adv.*)

" of R. S. Bradley, Esq., Boston, Mass. Little & Browne, Archts., 1360 (*Int.*): —

Entrance, 1360 (*Reg.*)

" " John Caldwell, Stockbridge, Mass. G. E. & G. Fountain, Archts., 1361 (*Reg.*)

" " C. C. Febiger, Esq., Philadelphia, Pa. Horace Sellers, Archt., 1359 (*Int.*): —

Garden, 1363 (*Int.*)

Living-room, 1359 (*Int.*)

Parlor, 1363 (*Reg.*)

" " P. L. Ford, New York, N. Y. H. R. Marshall, Archt., 1369 (*Int.*): —

Entrance, 1369 (*Int.*)

" " Herr Glade, Wilmersdorf, Prussia. Erich Peters, Archt., 1369 (*Int.*)

" " J. W. McClymonds, Esq., Massillon, O. C. F. Schweinfurth, Archt., 1362 (*Int.*)

" " Mrs. Catherine Minot. Peabody & Stearns, Archts., 1360 (*Int.*)

" " Thomas Nelson Page, Esq., Washington, D. C. McKim, Mead & White, Archts., 1369 (*Int.*)

" " Robert S. Peabody, Esq., Boston, Mass. Peabody & Stearns, Archts., 1363 (*Int.*)

" " Moorfield Storey, Esq., Boston, Mass. Peabody & Stearns, Archts., 1361 (*Int.*)

" " Mrs. L. L. Swann, Stockbridge, Mass. R. S. Stephenson, Archt.: —

Northwest View, 1368 (*Reg.*)

South Front, 1368 (*Int.*)

Palazzo Margherita, formerly Piombino, Rome, Italy. Gaetano Koch, Archt., 1360 (*Reg.*): —

Corridor, 1360 (*Int.*)

Main Staircase, 1360 (*Reg.*)

Residence for Mrs. William L. Skinner. Vas & Takach, Archts., 1365 (*Reg.*)

"Shoreby," Summer Home of Samuel Mather, Esq., Shore of Lake Erie. C. F. Schweinfurth, Archt., 1362 (*Reg.*)

Study for Two Houses on the Bay State Road, Boston, Mass. Shepley, Rutan & Coolidge, Archts., 1359 (*Reg.*)

"Tigbourne Court," Witley, Eng. E. L. Lutyens, Archt., 1361 (*Adv.*)

"Ventfort Hall," Lenox, Mass. Rotch & Tilden, Archts., 1362 (*Reg.*); —

Garden Front, 1362 (*Int.*)

Main Front, 1362 (*Int.*)

Warwick Castle, 1364 (*Reg.*)

Windsor Castle: 2 Views, 1364 (*Reg.*)

ECCLESIASTICAL.

Belfry and the Cathedral of St. Bavon, Ghent, Holland, 1365 (*Adv.*)

Cathedrals one will never see: Laon, Strasbourg; Rheims; Amiens; Chartres; Paris; Beauvais, 1358 (*Reg.*)

Church of S. Giustina, Padua, Italy. Andrea Riccio, Archt., 1368 (*Int.*)

Competitive Designs for the Façade of San Lorenzo, Florence, Italy. Submitted by Messrs. R. Sabatini, C. Bazzani, E. Collamarini, G. Calderini, 1362 (*Int.*)

Design for Proposed Church in the Suburbs of Boston, Mass.: 2 Plates. Cram, Goodhue & Ferguson, Archts., 1368 (*Reg.*)

(*Ecclesiastical Continued.*)

Jubé Staircase: St. Etienne du Mont, Paris, France; St. Vincent de Paul, Paris, France, 1359 (*Int.*)

La Porte Guillaume and the Cathedral, Chartres, France, 1361 (*Adv.*)

Phillips Congregational Church, Exeter, N. H. Cram, Goodhue & Ferguson, Archts., 1368 (*Int.*): —

East Front, 1368 (*Int.*)

Portal; Church of St. Radégonde, Poitiers, France, 1359 (*Int.*)

Presbyterian Church, Stockbridge, Mass. McKim, Mead & White, Archts., 1364 (*Int.*)

Rivaulx Abbey, England; Itham Moat, England, 1361 (*Reg.*)

Ruins of Rivaulx Abbey; Nave of Winchester Cathedral, 1364 (*Reg.*)

St. Paul's Church, Nantucket, Mass. J. W. Northrop, Archt., 1370 (*Reg.*)

St. Peter's R. C. Church, Columbia, S. C. G. I. Lovatt, Archt., 1367 (*Reg.*): —

Preliminary Study for Same, 1367 (*Reg.*)

Smithells Old Hall and Chapel, Lancashire, Eng., 1369 (*Int.*)

Transept Screen: St. Luke's, Germantown, Pa. G. T. Pearson, Archt., 1364 (*Reg.*)

EDUCATIONAL.

Architectural Building, Harvard University, Cambridge, Mass. McKim, Mead & White, Archts., 1365 (*Int.*): —

Entrance-hall, 1365 (*Int.*)

Competitive Design for a High-school House, Rock Island, Ill. O. Z. Cervin, Archt., 1359 (*Reg.*)

Fraternity House, University of Pennsylvania, Philadelphia, Pa. Chester Kirk, Archt., 1363 (*Int.*)

Hungerford Memorial Bede Houses and Free School, Corsham, Wilts, Eng., 1362 (*Adv.*)

Public School No. 166, New York, N. Y. C. B. J. Snyder, Archt., 1370 (*Int.*): —

Entrance to Same, 1370 (*Int.*)

HOTELS.

Hotel Manhattan, New York, N. Y. H. J. Hardenbergh, Archt.: —

Dining-room, 1366 (*Int.*)

Interior Door, 1366 (*Int.*)

Willard's Hotel, Washington, D. C. H. J. Hardenbergh, Archt., 1365 (*Reg.*): —

Scale Details, 1365 (*Reg.*)

INTERIORS.

Entrance-hall, Architectural Building, Harvard University, Cambridge, Mass. McKim, Mead & White, Archts., 1365 (*Int.*)

Hotel Manhattan, New York, N. Y. H. J. Hardenbergh, Archt.: —

Dining-room, 1366 (*Int.*)

Interior Door, 1366 (*Int.*)

Jubé Staircase: St. Etienne du Mont, Paris, France, 1359 (*Int.*)

Künstlerhaus, Munich, Bavaria. Interior Views: 2 Plates. Gabriel Seidl, Archt., 1360 (*Int.*)

Palazzo Margherita, formerly Piombino, Rome, Italy. Gaetano Koch, Archt.: —

Corridor, 1360 (*Int.*)

Main Staircase, 1360 (*Reg.*)

Parlor: House of C. C. Febiger, Esq., Philadelphia, Pa. Horace Sellers, Archt., 1363 (*Reg.*)

Vestibule: Château de Chantilly, France. Grand Stairway: The Sorbonne, Paris, France, 1368 (*Int.*)

LIBRARIES.

Design for Roswell P. Flower Memorial Library. Brun, Hauser & Lapointe, Archts., 1362 (*Reg.*)

Hatch Library, Adelbert College, Cleveland, O. C. F. Schweinfurth, Archt., 1370 (*Reg.*)

Public Library, Thompson, Conn. Gay & Proctor, Archts., 1362 (*Reg.*)

MERCANTILE.

Banking-house of Edward C. Jones, Philadelphia, Pa. Guy King, Archt., 1361 (*Int.*)

(*Mercantile Continued.*)

Entrance to the Equitable Life Assurance Building, New York, N. Y. G. B. Post, Archt., 1361 (*Reg.*)

London and County Banking Co. Building, Petworth, Eng. Wheeler & Lodge, Archts., 1364 (*Int.*)

MISCELLANEOUS.

"The Amalienburg," Munich, Bavaria, 1360 (*Int.*)

Bassin du Dragon, Versailles, France. Harde de Cerfs, Garden of the Luxembourg, Paris, France. LeDuc, Sculptor, 1368 (*Adv.*)

Boulevard Entrance to Gordon Park, Cleveland, O. C. F. Schweinfurth, Archt., 1370 (*Reg.*)

Cancello della Villa Massimi, in Via Merulana, Rome, Italy, 1358 (*Adv.*)

Castle Acre Priory, Norfolk, Eng., 1361 (*Reg.*)

City Museum, Altoona, Prussia. Reinhardt & Süssenguth, Archts., 1369 (*Int.*): —

Central Pavilion, 1369 (*Int.*)

Deciduous Cypress, Villa Doria-Pamphili, Rome, Italy, 1358 (*Int.*)

Detail of Central Fountain: Villa Lante, Bagnaia, Italy, 1358 (*Int.*)

Doric Order (Denticulated), 1359 (*Reg.*)

Garden of C. C. Febiger, Esq., Philadelphia, Pa., 1363 (*Int.*)

Gateway: Hampton Court Palace; Gateway: Syon House, Middlesex, Eng., (*Int.*)

Marquetry Panels for the S. S. "Orontes." Designed by Stephen Webb, 1367 (*Adv.*)

Models for the Washington Improvement Scheme, 1367 (*Int.*)

Der Neunerthor, Salzburg, Austria, 1363 (*Adv.*)

Pine Tree forms as Frieze Decorations, 1361 (*Int.*)

Portal: Church of St. Radégonde, Poitiers, France; Portals: House of Jacques Cœur, Bourges, France, 1359 (*Int.*)

Rivaulx Abbey, England; Itham Moat, England, 1361 (*Reg.*)

Ruins of Rivaulx Abbey; Nave of Winchester Cathedral, 1364 (*Reg.*)

Sewage-disposal System. A. W. C. Tucker, Engineer, 1365 (*Reg.*)

Smithells Old Hall and Chapel, Lancashire, Eng., 1369 (*Int.*)

Street Fronts, Brussels, Belgium: 2 Plates, 1366 (*Int.*)

Terrace Gardens, Foots-gray Place, Sidcup, Eng. Mawson & Gibson, Archts., 1361 (*Int.*)

" and Summer-houses, Dazham Hall, Suffolk, Eng. Mawson, Mallows & Grocock, Archts., 1361 (*Int.*)

Tower of London, 1369 (*Reg.*)

Treatment of the White House Lot, Washington, D. C., 1367 (*Int.*)

Views at the Paris Exposition of 1900: —

Greek Building: Rue des Nations; Rue des Nations, 1359 (*Int.*)

Palais des Invalides; Horticultural Building and Building of the City of Paris, 1359 (*Int.*)

Water-tower No. 3, and Hook-and-ladder House No. 24, New York, N. Y. Horgan & Slattery, Archts., 1363 (*Reg.*)

MONUMENTAL.

Details of the De la Montagna Mausoleum, Cypress Lawn Cemetery, San Francisco, Cal. B. J. S. Cahill, Archt., 1370 (*Reg.*)

Monument in the Cemetery at Stuttgart, Würtemberg. Eisenlohr & Weigle, Archts., 1359 (*Reg.*)

" to Charles Mathieu, Lorches, Nord, France. C. Moyaux, Archt.; C. Theunissen, Sculptor, 1360 (*Adv.*)

OFFICE-BUILDINGS.

Atlantic Building, New York, N. Y. Clinton & Russell, Archts., 1358 (*Int.*): —

Detail of Same, 1358 (*Int.*)

Entrance to the Prudential Life Building, Newark, N. J. G. B. Post, Archt., 1365 (*Int.*)

PUBLIC BUILDINGS.

City-hall: Second-prize Design for, Riga, Russia. Walter & Heger, Archts., 1370 (*Adv.*)

Competitive Design for the U. S. Post-office, Court-house and Custom-house, Cleveland, O. C. F. Schweinfurth, Archt., 1365 (*Int.*)

Imperial Museum, Constantinople, Turkey, 1367 (*Int.*)

" Post-office, Berlin, Prussia, 1367 (*Int.*)

(*Public Buildings Continued.*)

Künstlerhaus, Munich, Bavaria. Interior Views: 2 Plates. Gabriel Seidl, Archt., 1360 (*Int.*)

The Mauritshuis, The Hague, Holland, 1368 (*Int.*)

U. S. Custom-house, Baltimore, Md. Hornblower & Marshall, Archts. J. K. Taylor, Supervising Archt., 1367 (*Reg.*)

" Post-office, Clinton, Ia. J. K. Taylor, Supervising Archt., 1363 (*Reg.*):—

Pavilion-detail, 1363 (*Reg.*)

Window-detail, 1363 (*Int.*)

(*Public Buildings Continued.*)

U. S. Post-office, Creston, Ia. J. K. Taylor, Supervising Archt., 1369 (*Reg.*):—

Portico Details, 1369 (*Reg.*)

" " Kansas City, Kan. J. K. Taylor, Supervising Architect, 1364 (*Reg.*)

U. S. Post-office and Court-house:—

Elmira, N. Y. J. K. Taylor, Supervising Archt.:—

Detail of Front Entrance, 1366 (*Reg.*)

(*Public Buildings Continued.*)

U. S. Post-office and Court-house:—

Elmira, N. Y. J. K. Taylor, Supervising Archt.:—

Section, Plan and Elevation, 1366 (*Reg.*)

Staircase Detail, 1366 (*Reg.*)

Freeport, Ill. J. K. Taylor, Supervising Archt., 1360 (*Reg.*)

THEATRES.

New Theatre [Majestic], Tremont St. and Van Rensselaer Pl., Boston, Mass.: 2 Plates. J. M. Wood and J. G. Howard, Archts., 1358 (*Reg.*)

TEXT CUTS.

[*The figures refer to the page of text, not to the number of the journal.*]

Abbey Gateway, Abingdon, 14

American Vignola Diagrams, 11, 12

Broughton Castle, Oxfordshire, 91

Church of St. Nicholas, Abingdon, 12

Church of St. Nicholas and Christ Church Almshouses, Abingdon, 13

Christ Church Almshouses, Abingdon, 13

" " Hants, 28, 29

Deanery, Exeter, Eng. The, 93

Doorway: St. John's Hospital, Northampton, 93

Kenilworth Castle (Plan), 52

Market-cross, Malmesbury, Eng., 91

Oxburgh Hall, Norfolk, 92

Roof: Canynges House, Bristol, 91

Washington Improvement-plan Diagrams, 75, 76, 77

Wolterton Manor-house, 92

INDEX BY LOCATION.

[*The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation.*]

—A—

Aboyne, Eng. House on the River Dee. J. M. Pirie, Archt., 1364 (*Int.*)

Altona, Prussia. City Museum. Reinhardt & Süssenguth, Archts., 1369 (*Int.*):—

Central Pavilion, 1369 (*Int.*)

—B—

Bagnaia, Italy. Detail of Central Fountain: Villa Lante, 1358 (*Int.*)

Baltimore, Md. U. S. Custom-house. Hornblower & Marshall, Archts. J. K. Taylor, Supervising Archt., 1367 (*Reg.*)

Basel, Switzerland. Prize Design for Bridge over the Rhine, 1364 (*Int.*)

BERLIN, PRUSSIA:—

Imperial Post-office, 1367 (*Int.*)

BOSTON, MASS.:—

House of R. S. Bradley, Esq. Little & Browne, Archts., 1360 (*Int.*)

Entrance, 1360 (*Reg.*)

" " Mrs. Catherine Minot. Peabody & Stearns, Archts., 1360 (*Int.*)

" " Rob't S. Peabody, Esq. Peabody & Stearns, Archts., 1363 (*Int.*)

" " Moorfield Storey, Esq. Peabody & Stearns, Archts., 1361 (*Int.*)

New Theatre [Majestic], Tremont St. and Van Rensselaer Pl.: 2 Plates. J. M. Wood and J. G. Howard, Archts., 1358 (*Reg.*)

Study for two Houses on the Bay State Road. Shepley, Rutan & Coolidge, Archts., 1359 (*Reg.*)

Bourges, France. Portals: House of Jacques Cœur, 1359 (*Int.*)

Brussels, Belgium. Street Fronts: 2 Plates, 1366 (*Int.*)

—C—

Cambridge, Mass. Architectural Building, Harvard University. McKim, Mead & White, Archts., 1365 (*Int.*):—

Entrance-hall, 1365 (*Int.*)

Cambridge, Mass. Club-house of the A. D. Club. C. K. Cummings and Parker & Thomas, Archts., 1367 (*Reg.*):—

Members' Entrance, 1367 (*Int.*)

Store Entrance, 1367 (*Int.*)

Cantal, France. Pont de Garabit: 2 Views, 1370 (*Int.*)

Chantilly, France. Vestibule: Château, 1368 (*Int.*)

Chartres, France. La Porte Guillaume and the Cathedral, 1364 (*Adv.*)

Cleveland, O. Boulevard Entrance to Gordon Park. C. F. Schweinfurth, Archt., 1370 (*Reg.*)

" " Competitive Design for the U. S. Post-office, Court house and Custom-house. C. F. Schweinfurth, Archt., 1365 (*Int.*)

" " Hatch Library, Adelbert College. C. F. Schweinfurth, Archt., 1370 (*Reg.*)

" " Home of D. Z. Norton, Esq. C. F. Schweinfurth, Archt., 1366 (*Reg.*)

Clinton, Ia. U. S. Post-office. J. K. Taylor, Supervising Archt., 1363 (*Reg.*):—

Pavilion-detail, 1363 (*Reg.*)

Window-detail, 1363 (*Int.*)

Columbia, S. C. St. Peter's R. C. Church, G. I. Lovatt, Archt., 1367 (*Reg.*):—

Preliminary Study for Same, 1367 (*Reg.*)

Constantinople, Turkey. Imperial Museum, 1367 (*Int.*)

Corsham, Wilts, Eng. Hungerford Memorial Bede Houses and Free School, 1362 (*Adv.*)

Creston, Ia. U. S. Post-office. J. K. Taylor, Supervising Archt., 1369 (*Reg.*):—

Portico Details, 1369 (*Reg.*)

—E—

Elmira, N. Y. U. S. Post-office and Court-house. J. K. Taylor, Supervising Archt.:—

Detail of Front Entrance, 1366 (*Reg.*)

Section, Plan and Elevation, 1366 (*Reg.*)

Staircase Detail, 1366 (*Reg.*)

Exeter, N. H. Phillips Congregational Church. Cram, Goodhue & Ferguson, Archts., 1368 (*Int.*):—

East Front, 1368 (*Int.*)

—F—

Florence, Italy. Competitive Designs for the Façade of San Lorenzo. Submitted by Messrs. R. Sabatini, C. Bazzani, E. Collamarini, G. Calderini, 1362 (*Int.*)

Freeport, Ill. U. S. Post-office and Court-house. J. K. Taylor, Supervising Archt., 1360 (*Reg.*)

—G—

Germantown, Pa. Transept Screen: St. Luke's. G. T. Pearson, Archt., 1364 (*Reg.*)

Ghent, Holland. Belfry and the Cathedral of St. Bavon, 1365 (*Adv.*)

—H—

Hatfield House, England, 1369 (*Reg.*)

—I—

Itham Moat, England, 1361 (*Reg.*)

—K—

Kansas City, Kan. U. S. Post-office. J. K. Taylor, Supervising Archt., 1364 (*Reg.*)

—L—

Lancashire, Eng. Smithells old Hall and Chapel, 1369 (*Int.*)

Lenox, Mass. "Ventfort Hall." Roteh & Tilden, Archts., 1362 (*Reg.*):—

Garden Front, 1362 (*Int.*)

Main Front, 1362 (*Int.*)

LONDON, ENG.:—

Tower of London, 1369 (*Reg.*)

Lorches, Nord, France. Monument to Charles Mathieu. C. Moyaux, Archt.; C. Theunissen, Sculptor, 1360 (*Adv.*)

—M—

Massillon, O. House of J. W. McClymonds, Esq. C. F. Schweinfurth, Archt., 1362 (*Int.*)

Middlesex, Eng. Gateway: Hampton Court Palace; Gateway: Syon House, 1358 (*Int.*)

Munich, Bavaria. "The Amalienburg," 1360 (*Int.*)

" " Künstlerhaus. Interior Views: 2 Plates. Gabriel Seidl, Archt., 1360 (*Int.*)

—N—

Nantucket, Mass. St. Paul's Church. J. W. Northrup, Archt., 1370 (*Reg.*)

Newark, N. J. Entrance to the Prudential Life Building. G. B. Post, Archt., 1365 (*Int.*)

NEW YORK, N. Y.:—

Atlantic Building. Clinton & Russell, Archts., 1358 (*Int.*):—

Detail of Same, 1358 (*Int.*)

Entrance to Apartment-house. D'Oench & Simon, Archts., 1364 (*Int.*)

" " the Equitable Life Assurance Building. G. B. Post, Archt., 1361 (*Reg.*)

Hotel Manhattan. H. J. Hardenbergh, Archt.:—

Dining-room, 1366 (*Int.*)

Interior Door, 1366 (*Int.*)

House of P. L. Ford, Esq. H. R. Marshall, Archt., 1369 (*Int.*):—

Entrance, 1369 (*Int.*)

Public School No. 166. C. B. J. Snyder, Archt., 1370 (*Int.*):—

Entrance to Same, 1370 (*Int.*)

New York, N. Y.:—
Water-tower No. 3, and Hook-and-ladder House No. 24. Horgan & Slattery, Archts., 1363 (*Reg.*)
Norfolk, Eng. Castle Acre Priory, 1361 (*Reg.*)

— P —

Padua, Italy. Church of S. Giustina. Andrea Riccio, Archt., 1368 (*Int.*)
Paris, France:—
Design for the Pont de la Monnaie. Ed. Berard, Archt., 1364 (*Int.*)
Doorway of the Grand Palais, 1368 (*Int.*)
Entrance to the Ministry of the Colonies: The Tuileries, 1368 (*Int.*)
Grand Stairway: The Sorbonne, 1368 (*Int.*)
Harde de Cerfs, Garden of the Luxembourg. LeDuc, Sculptor, 1368 (*Adv.*)
House on the Avenue Malakoff. M. Le Voisvenel, Archt.; House on the Rue de la Convention. M. Legriel, Archt., 1366 (*Adv.*)
" in the Rue Octave Feuillet. M. Arnaud, Archt., 1369 (*Adv.*)
Jubé Staircase: St. Etienne du Mont, 1369 (*Int.*)
Pont Alexandre III: 2 Views, 1370 (*Int.*)
" de l'Alma and Buildings of the Paris Exposition of 1900; Pont au Change and the Conciergerie, 1370 (*Int.*)
" des Arts and the Palais de l'Institut. M. Louis Levau, Archt.; Pont Neuf, Statue of Henri IV and the Panthéon, 1370 (*Int.*)
Paris, France:—
St. Vincent de Paul, 1359 (*Int.*)
Views at the Exposition of 1900:—
Greek Building: Rue des Nations; Rue des Nations, 1359 (*Int.*)
Palais des Invalides; Horticultural Building and Building of the City of Paris, 1359 (*Int.*)
Petworth, Eng. London and County Banking Co. Building. Wheeler & Lodge, Archts., 1364 (*Int.*)
Philadelphia, Pa.:—
Additions to House of E. W. Clark. G. T. Pearson, Archt., 1360 (*Reg.*)
Banking-house of Edward C. Jones. Guy King, Archt., 1361 (*Int.*)
Fraternity House, University of Pennsylvania. Chester Kirk, Archt., 1363 (*Int.*)
House of C. C. Febiger, Esq. Horace Sellers, Archt., 1359 (*Int.*):—
Garden, 1363 (*Int.*)
Living-room, 1359 (*Int.*)
Parlor, 1363 (*Reg.*)
Poitiers, France. Portal: Church of St. Radégonde, 1359 (*Int.*)

— R —

Riga, Russia. Second-prize Design for City-hall. Walter & Heger, Archts., 1370 (*Adv.*)
Rivaulx Abbey, England, 1361 (*Reg.*)
" Eng. Rivaulx Abbey, 1364 (*Reg.*)
Rock Island, Ill. Competitive Design for a High-school House. O. Z. Cervin, Archt., 1359 (*Reg.*)
Rome, Italy:—
Cancello della Villa Massimi in Via Merulana, 1358 (*Adv.*)
Deciduous Cypress, Villa Doria Pamphili, 1358 (*Int.*)
Palazzo Margherita, formerly Piombino. Gaetano Koch, Archt., 1360 (*Reg.*):—
Corridor, 1360 (*Int.*)
Main Staircase, 1360 (*Reg.*)

— S —

Salzburg, Austria. Der Neunerthor, 1363 (*Adv.*)
San Francisco, Cal. Details of the De la Montagna Mausoleum, Cypress Lawn Cemetery. B. J. S. Cahill, Archt., 1370 (*Reg.*)
Shardi, India. Rope Bridge over the Kishanganga, 1364 (*Int.*)
Sidcup, Eng. Terrace Gardens, Foots-Gray Place. Mawson & Gibson, Archts., 1361 (*Int.*)
Stockbridge, Mass.:—
House of John Caldwell. G. E. & G. Fountain, Archts., 1361 (*Reg.*)
" " Mrs. L. L. Swann. R. S. Stephenson, Archt.:—
Northwest View, 1368 (*Reg.*)
South Front, 1368 (*Int.*)
Presbyterian Church. McKim, Mead & White, Archts., 1364 (*Int.*)
Stuttgart, Wurtemberg. Monument in the Cemetery. Eisenlohr & Weigle, Archts., 1359 (*Reg.*)
Suffolk, Eng. Terrace and Summer-houses, Dazham Hall. Mawson, Mallows & Grocock, Archts., 1361 (*Int.*)
Surrey, Eng. Frimley Court. F. S. Taylor, Archt., 1359 (*Adv.*)

— T —

The Hague, Holland. The Mauritshuis, 1368 (*Int.*)
Thompson, Conn. Public Library. Gay & Proctor, Archts., 1362 (*Reg.*)

— V —

Versailles, France. Bassin du Dragon, 1368 (*Adv.*)

— W —

Warwick, Eng. Warwick Castle, 1364 (*Reg.*)
Washington, D. C.:—
House of Thomas Nelson Page, Esq. McKim, Mead & White, Archts., 1369 (*Int.*)
Improvement Scheme. Models for the, 1367 (*Int.*)
White House Lot. Treatment of the, 1367 (*Int.*)
Willard's Hotel. H. J. Hardenbergh, Archt., 1365 (*Reg.*):—
Scale Details, 1365 (*Reg.*)
Wilmersdorf, Prussia. House of Herr Glade. Erich Peters, Archt., 1369 (*Int.*)
Winchester, Eng. Winchester Cathedral, 1364 (*Reg.*)
Windsor, Eng. Windsor Castle: 2 Views, 1364 (*Reg.*)
Witley, Eng. "Tigbourne Court." E. L. Lutyens, Archt., 1361 (*Adv.*)

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL LXXVI

APRIL - JUNE

* 1902 *

BOSTON
AMERICAN ARCHITECT AND BUILDING NEWS CO.
211 TREMONT STREET

HELIOTYPE

L.S. IPSEN - DEL.

S. J. Parkhill & Co., Printers
Boston, U. S. A.

INDEX TO VOLUME LXXVI.

APRIL — JUNE, 1902.

ACCIDENTS: —
Boiler explosion in Detroit, 42
Building-accidents in New York, 17
Dust-explosions in a Tennessee Coal-mine, 18
Elevators in New York. Fall of two, 98
Fall of Stone in New York Subway injures Contractor, 97
" " Tower of Cathedral, Cuenca, Spain, 104
Grain Elevators. Failure of, 73

Accidents caused by splitting of Stone through the Rusting of inserted Iron, 2
Acetylene Generators. Test of, 32
Advertising. The Abuses of, 10
Age-limit for Labor? Is Forty-five the, 24
American Art-purchasers, 104
" Taste in Colossal Statues The *Builder* on, 81
" Vignola, The, 35
Ancient Italian Monuments, 104

ANECDOTES: —
Artist. The Parish-priest and the, 32
Puvis de Chavannes as a Caricaturist, 72

Angelo. The Genius of Michael, 91
Antiquities. Dorian, 96
" Soudanese Christian, 96
Apartment Craze of Twenty Years ago. The Coöperative, 97
Apartment-houses not Tenements, 8
Apprenticeship Question and Trade-unions. The, 82
Archæological Research. The Central American Field for, 18

ARCHÆOLOGICAL: —
Carthage. Excavations at, 24
Christian Antiquities in the Soudan, 96
City of the Zapotecas discovered. An ancient, 32
Copan, Honduras. The Great Stairway at, 2
Dorian Antiquities, 96
Homestead Entry cancelled. A, 40
Island of Philæ and the Assuan Dam, 72
Italian Monuments. Movement to preserve, 104
Pickaxe of tempered Copper. An ancient, 8
Restoration of the Erechtheum, 88
Submarine Roman Remains of the Italian Littoral, 64
Village in Wisconsin. Prehistoric, 104

Architects invited to give Bonds. Warning to, 65
Architects' License-law. New Jersey, 78
Architects in New Jersey. The Registration of, 71
Architectural Club. The Exhibition of the Boston, 54
" " Exhibition and its Catalogue. Chicago, 29
Architectural Embellishments. Statues of Notables as, 66
" Treatment of Bridges. The, 14
Architecture in England during the Middle Ages. Domestic, 27, 59
" at Harvard University. The Robinson Travelling-fellowship in, 33
" Michael Angelo and, 91
" A Plea for Women practising, 20
Arizona. Deposit of White Onyx in, 88
Art Congress to be held at Innsbrück. History of, 26
Art-purchasers. American, 104
Art Students' League of New York. Operations of the, 74
Artist. The Parish-priest and the, 32
Assuan Dam. The Island of Philæ and the, 72
Athens. Monument to Professor Merriam at, 80
Avignon. The Partial Demolition of the Walls of, 42

— B —

Baltimore Art Commission protects the Battle Monument of that City, 73
Battle Monument. Baltimore Art Commission arrests Damage to, 73
Bells. Burmese, 15
Bénard made Professor at the École des Beaux-Arts. M., 98
Benefit of Good Tenement-houses to the Social Body Politic, 9
Bentley and the Royal Gold Medal. The late Mr , 42
Berlin Zoölogical Gardens. The, 26
Bernini. The unknown, 19
Bird's-eye Maple, 96
Blasting with Freezing Water, 80
" and the Rights of Invalids, 81
Blasting-rights on Manhattan Island, 88
Boiler-explosion in Detroit. Makers responsible for, 42
Boiler. Repairing a, 72
Bonds. Warning to Architects invited to give, 65

BOSTON: —
Architectural Club. The Exhibition of the, 54
Building-laws in the matter of Subdivision of Space. Attempt to Modify, 41
Charles River Dam and its Effect on the Harbor. The Proposed, 74
Experiment Station. The new Insurance Engineering, 65
M. I. T. Architectural Department should remain in City. Why, 49
Museum of Fine-Arts. Annual Report of the, 34
" " " The new Director of the, 73
School-houses and Cost of Janitor Service, 33
Shaw Monument. A Criticism of the, 85

Botticelli Sale by Chigi. Sequel of the, 24
Breadth of a River. To judge the, 16
Brick. A porous Nailing, 90
Bricklaying and Brick-cutting. By H. W. Richards, 95
Bricklaying. A Day's Work in British, 8
Brickwork: Efflorescence upon, an Indication of Danger to enclosed Steel Frame, 65
Bridge-building. A Feat of, 88
Bridges. The Architectural Treatment of, 14
British Bricklaying. A Day's Work in, 8
" Coal and Iron Trades. Renewed Life in, 26
Brock's "Lord Leighton" cast in Belgium, 24
Bronze Figure of Lord Leighton cast in Belgium, 24
Brookline. M. I. T. to move some of its Departments to, 49
Builder on American Taste in Colossal Statues. The, 81
Building-interests and the approaching Movement in Real-estate, 25
Building-law and Fireproof Wood. The N. Y., 57
Building-laws. Importance of Enforcement of, 9
" in the matter of Subdivision of Space. Attempt to modify the Boston, 41
Building-legends, 15
Building-wrecking by Electricity, 104
Buildings. Structural Color Decoration of the Interior of Public, 30, 38, 53
Burmese Bells, 15
Burning of an All-steel Grain-elevator, 74

— C —

California's Royal Road to be restored to Usefulness, 8
Canons' Stalls for Westminster Cathedral, 24
Canton, 61, 75, 83
Capital. The Volute of the Ionic, 50
Capitol. Enlargement of the Maryland State, 57
Caricaturist. Bernini as a, 19
" Puvis de Chavannes as a, 72
Carthage. Excavations at, 24
Carvings. Old Wood, 104
Cascade (artificial) in Europe. Highest, 58
Catalogue of the Chicago Architectural Club Exhibition, 29
Cathedral. Accident in Cuenca, 104
" of "Our Lady of Kazan," St. Petersburg. Architect of the, 80
" Truro. Repairs on the, 82
Cause of a Boiler-explosion in Detroit, 42
Cave in S. Dakota. A Wind, 80
Celluloid. Object-lesson on the Inflammability of, 82
Central American Field for Archæological Research. The, 18
" Park, N. Y. C., in Need of Fresh Soil, 66
Charles River Dam and its Effect on Boston Harbor. The Proposed, 74
Chavannes as a Caricaturist. Puvis de, 72
Chemicals on Sea-water. Curious Effect of, 24

CHICAGO: —
Architectural Club Exhibition and its Catalogue, 29
Building News, 29
Demand for Higher Wages, 29
Fall of a Building, 10
Labor and Materials. High Cost of, 29
Lake Front Question, 29
Letter from, 29
Smith's Warning about Steel-skeleton Buildings. General Sooy, 29

China. Journal Sketches in, 11, 43, 51, 61, 75, 83
Chinese Coffins and Lumber, 56
Christian Antiquities in the Soudan, 96
Church Ornaments. The Origin and Symbolism of, 98
Churches without Musical Instruments. Non-success of two, 103
" Some remodelled Colonial, 37
City of the Zapotecas discovered. An Ancient, 32
Cleaning the Battle Monument. Baltimore, 73
Coal and Iron Trades. Renewed Life in British, 26
Coffins. Lumber and Chinese, 56
Collections of the Louvre and their Exposure to Fire, 17
Colonial Churches. Some Remodelled, 37
Colonnade Hotel in New York. Proposal to use the Columns of the, 42
Color-decoration of the Interior of Public Buildings. Structural, 30, 38, 53
Color Problems. By Emily Noyes Vanderpoel, 94
Colored Wax Stoppings, 86
Colossal Statues. The *Builder* on American Taste in, 81
Columbia University. The New Department of Fine-Arts at, 49
Columns of the "Colonnade Hotel" in New York. Proposal to use the, 42
" Greek, 24
Combinations in America and Abroad. Industrial, 90

COMPETITIONS: —
Electrolier, N. Y. C., 66
Emblem for the Louisiana Purchase Exposition, 57
McClellan Statue. The, 32

Competition Discussion. The Washington Grant Monument, 34
" for the Grant Monument. Dissatisfaction with Result of, 26
Conchology and Spiral Stairs, 88
Concrete Factory-building. A., 48
" Use of Magnetite in, 24
" Structures. Differing Expert Statements concerning Steel and, 50
" and Tar Nailing Brick. A, 90

Condition of the Smaller Industries of Germany, 90
Congress to be held at Düsseldorf. The Ship-building, 58
" of the History of Art at Innsbrück. Coming, 26
Constant, Painter. Death of J. J. Benjamin, 74
Construction. Notes on Iron and Steel, 3, 67, 99
Continental Construction. The "Incombustible" Nature of, 10
Contracts of Horgan & Slattery. The, 10
" The Invalidity of unsealed Corporate, 72
Coöperative-Apartment Craze of Twenty Years ago, 97
Copan, Honduras. The Great Stairway at, 2
Cornell University. Resignation of the Professor of Architecture, 34
Corporate Contracts. The Invalidity of, 72
Cos. Proposed excavations in the Island of, 96
Cost of Materials and Labor in Chicago. High, 29
Costly Ready-made Dwellings in New York, 57
Court Labor Rulings. Some, 96
Crane. A large, 88
Criticism of the Shaw Monument, Boston. A, 85
Crops, Trusts and Dividends, 81
Cuenca Cathedral Accident. The, 104
Cumberland Road. The, 64

— D —

Dalou, Sculptor. Death of Jules, 26
Dam across Charles River. The Proposed, 74
" The Island of Philæ and the Assuan, 72
Danger from Wooden Staging in Westminster Abbey, 23
Decoration of the Interior of Public Buildings. Structural Color, 30, 38, 53
Decrease in Number of New York Stables, 103
Demand for Higher Wages in Chicago, 29
Demolition of the Walls of Avignon. The Partial, 42
Department of Fine-Arts at Columbia University. The New, 49
Deposit upon St. Paul's Cathedral, London, 88, 95
Development of the Country along the Trans-Siberian Railway, 58
" " " Pratt Institute, Brooklyn, New York, 66
District Surveyorship System applicable in New York. The London, 41
Dividends, Crops and Trusts, 81
Dome of the Paris Panthéon. The, 8
Domestic Architecture in England during the Middle Ages, 27, 59
Dorian Antiquities, 96
Düsseldorf Ship-building Congress. The, 58
Dust-explosions in Mines and Mills, 18
Duty levied upon a Statue of Rochambeau, 25
" upon La Fayette Relics intended for Congressional Library. The, 25
" on some Works of Art. An Attempt to remove, 66
Dwellings of the Wealthy in New York. The small Space available for, 57

— E —

École des Beaux-Arts. M. Bénard made Professor at the, 98
Effect of Chemicals on Sea-water. Curious, 24
" " Surroundings upon Schoolchildren, 33
Efflorescence on Brickwork an Indication of Danger to enclosed Steel Frame, 65
Egyptian Temples. Electricity in, 23
El Camino Real, California. Restoration of, 8
Electric-heating Device. An, 64
Electricity in Building-wrecking, 104
" " Egyptian Temples, 23
" " St. Paul's, London, 16
Electrolier. Competition for an, 66
Elevator Accidents. Two, 98
" Burning of an All-Steel Grain, 74
" of Concrete Cylinders. Failure of a Grain, 73
Emblem for the Louisiana Purchase Exposition. Competition for the, 57
Enforcement of Building-laws. Importance of, 9
" " N. Y. Theatre-laws. 17
Engineering Experiment Station. The New Insurance, 65, 80
" Proposed School of Insurance, 50

ENGINEERING:—
Bridge-building. A Feat of, 88
Bridges. The Architectural Treatment of, 14
Quicksand. A Foundation on, 22
Subway, N. Y.: How it will cross the Harlem River, 16
Underground Passageways of England. The, 87
England during the Middle Ages. Domestic Architecture in, 27, 59
" The Underground Passageways of, 87
English Law of Ancient Lights. Iniquity of the, 60
" Methods of Building. Inferiority of, 89
Erechtheum. Restoration of the, 88
Excavations at Carthage, 24
" " Copan, Honduras, 2

EXHIBITIONS:—
Exhibition of the Boston Architectural Club. The, 54
Chicago Architectural Club, 29

Expert Statements concerning Steel and Concrete Structures, 59
Experiment Station. The New Insurance Engineering, 65, 80
Explosion of Boiler in Detroit. Cause of, 42
Explosions in Mines and Mills. Dust, 18
Exposition Emblem. Competition for the Louisiana Purchase, 57
" Postponement of the Louisiana Purchase, 50
"Exuberance" of Messrs. Horgan & Slattery. The, 23

— F —

Factory-building. A Concrete, 48
Facts about Lightning, 48
Failure of a Grain-elevator of Concrete Cylinders, 73
Fall of a Chicago Building, 10
Feat of Bridge-building. A, 88
Fine-Arts. Annual Report of the Boston Museum of, 34
" Department at Columbia University. The New, 49
" The new Director of the Boston Museum of, 73
Fire-escapes for New York Hotels, 81
Fireproof Wood and the N. Y. Building-law, 57
Fire-protection. Proposed School for the Study of the Art of, 50
Fire-tax and the Inequality of Insurance-premiums. The increasing, 89
Fires in Tall Buildings. Mysterious, 64
" " Warehouses in the Barbican, London, 89
Forest-planting in New Hampshire, 2
Forests of Russia. The, 84
Foundation on Quicksand. A, 22
France. Roman and Romanesque, 46
Frost utilized for Blasting, 80

— G —

Gas. The Gains and Losses affecting Users of Natural, 18
Generators. Test of Acetylene, 32
Genius of Michael Angelo. The, 91
German old-age Pensions, 104
Germanic Museum at Harvard. The Swiss Contribution to the, 10
Germany. Condition of the Smaller Industries of, 90
" Long distance Heating in, 40
Glass Process. A Malleable, 16
Grain-elevator. Burning of an All-Steel, 74
" of Concrete Cylinders. Failure of a, 73
Grant Monument. Competition Discussion. The Washington, 26, 34
Great Britain. Municipal Socialism in, 70
Greek Columns, 24

— H —

Harvard University. The Robinson Travelling-fellowship in Architecture at, 33
Harvard's new Germanic Museum. The Swiss Contribution to, 10
Hatfield, England, 59
Heating in Germany. Long-distance, 40
" System. An Electric, 64
High Buildings. Mysterious Fires in, 64
Highest Fall of Water in Europe. The, 58
Homestead Entry cancelled. A, 40
Horgan & Slattery Contracts. The, 10
" " " The "Exuberance" of Messrs., 23
Hotels to be provided with Fire-escapes. New York, 81
Hours of Labor. The unconstitutional Penal-code Section relative to, 80
"House that Jerry built," 72

— I —

"Incombustible" Nature of Continental Construction. The, 10
Incrustation on St. Paul's Cathedral, London, 88, 95
Industrial Combinations in America and Abroad, 90
Industries in Germany. Condition of the Smaller, 90
Inferiority of English Methods of Building, 89
Inflammability of Celluloid. Object-lesson on the, 82
Iniquity of the English Law of Ancient Lights, 60
Inlay of Colored Wax, 86
Innsbrück. Coming Congress of the History of Art at, 26
Institute of Technology to move some of its Departments to Brookline, Mass., 49
Insurance Companies and Question of Rust in Steel-frame Structures, 41
" Engineering. Experiment-Station. The New, 65, 80
" " Proposed School of, 50
" Premiums. The increasing Fire-Tax and the Inequality of, 89
International Edition changes Form, 1
" " in Original Form, 81, 89, 97
Invalidity of unsealed Corporate Contracts, 72
Invalids. Blasting and the Rights of, 81
Ionic Capital. The Volute of the, 50
Iron and Coal Trades. Renewed Life in British, 26
" in contact with Masonry. Concerning the Question of preserving, 2
" and Steel Construction. Notes on, 3, 67, 99
Island of Philæ and the Assuan Dam, 72
Italian Monuments. Ancient, 104

— J —

Janitor Service in Boston Schoolhouses. Cost of, 33
Japanese, Sleeping-custom. A, 88
Jerry built. House that, 72
Jottings. A few Paris, 70
Journal Sketches in China, 11, 43, 51, 61, 75, 83

— L —

Laboring Man's Interest in "Trust" Prices. The, 25
Labor and Materials in Chicago. High Cost of, 29
" Unconstitutionality of Penal-code Section relative to Hours of, 80
" Rulings. Some Court, 96
La Fayette Relics intended for Congressional Library. The Duty upon, 25
" Hunaudaye, Brittany, 6
Lake-front Question, Chicago, 29
Law of Ancient Lights. Iniquity of the English, 60
Laws to be enforced regarding N. Y. Theatres, 17

LEGAL:—
Apartment-houses not Tenements, 8
Architects' License Law. New Jersey, 78
Blasting-rights on Manhattan Island, 88
Corporate Contracts. The Invalidity of unsealed, 72
English Law of Ancient Lights. Iniquity of the, 60
Labor Rulings. Some Court, 96
Penal-code Section relative to Hours of Labor unconstitutional, 80
Right of Way at Stonehenge. The, 88
Steps at Doorways, 56
"Structure" may be a Vessel in Course of Construction. A, 32
Tenement-house Law. The New York, 9
Trade Unions and the Apprenticeship Question, 82

Legends. Building, 15
Leighton. Brock's Bronze Figure of Lord, 24
Leipsic, Germany. Projected large Railway-station for, 58
Letter from Chicago, 29
" " Paris, 93
License Law. New Jersey Architects', 78
Lighting the Pyramids by Electricity, 13
Lightning. Facts about, 48
Lightning-rod Question. The, 24
Lights. Iniquity of the English Law of Ancient, 60
Lincoln Memorial at Washington. The proposed, 97
Liverpool, England. Municipal Socialism in, 70
"Lloyd's Register" Building. The new, 64
London District Surveyorship System applicable to New York, 41

LONDON:—
Balcony. Fall of a, 2
"Lloyd's Register" Building. The new, 64
St. Paul's Incrustation on, 88, 95
" " lighted by Electricity, 16
Street-sign for the Coronation. An historic, 48
Ventilating the Tunnels, 103
Warehouse Fires in the Barbican, 89
Westminster Abbey. Danger from Wooden Staging in, 23
" Cathedral. Canons' Stalls for, 24

Long-distance Heating in Germany, 40
Lord, Architect. Death of James Brown, 74
Louisiana Purchase Exposition:—
Emblem. Competition for the, 57
Postponement of the, 50
Proposed "Model City" at the, 17

Louvre Collections and their Exposure to Fire, 17
Lowell Mill Operative. The Status of the, 103
Lumber and Chinese Coffins, 56
" Probable Rise in Price of, 64
Lyons, France, 46

— M —

McClellan Statue Competition. The, 32
Magnetite in Concrete. Use of, 24
Malleable-glass Process. A, 16
Manhattan Island. Blasting-rights on, 88
Maple. Bird's-eye, 96
Maryland State-house. Enlargement of the, 57
Masonry. The Preserving of Iron in Contact with, 2
Mass. Institute of Technology to move some of its Departments to Brookline, 49
Medal of the R.I.B.A. The late Mr. Bentley and the Gold, 42
Mediterranean. Roman Remains beneath the, 64
Memorial to Abraham Lincoln at Washington. The proposed, 97
Meriden Gas-light Company erects a Gas-holder upon Quicksand, 22
Merriam. Monument at Athens to Professor, 80
Mexico's Sewerage System. The City of, 47
Michael Angelo. The Genius of, 91
Middle Ages. Domestic Architecture in England during the, 27, 59
Mill Operative. The Status of the Lowell, 90, 103
Mines and Mills. Dust Explosions in, 18
Model City at the St. Louis Exposition. The proposed, 17
Monument at Athens. Professor Merriam's, 80
" Baltimore Art Commission arrests Damage to Battle, 73
" to Colonel Shaw, Boston. A Criticism of the, 85
Monuments. Ancient Italian, 104
Movement in Real estate approaching, 25
Municipal Art Society of N. Y. and the proposed "Model City" at the St. Louis Exposition, 17
" Socialism, 70
Museum of Fine-Arts. Annual Report of the Boston, 34
" " " Boston. The new Director of the, 73
" at Harvard. The Swiss Contribution to the Germanic, 10
Musical Instruments. Non-success of two Churches without, 103
Mysterious Fires in Tall Buildings, 64

— N —

Natural-gas. The Gains and Losses affecting Users of, 18
New Hampshire Reforestation Movement. The, 2
" Jersey Architects' License Law, 78
" " The Registration of Architects in, 71
" York School-houses. Legislation for the Ventilation of, 1

NEW YORK:—
Accident to Subway Contractor, 97
Art Student's League. Operations of the, 74
Blasting-rights on Manhattan Island, 88
Building Accidents. Two, 17
" Law and Fireproof Wood, 57
Central Park reported in Need of fresh Soil, 66
Columbia University. The New Department of Fine-Arts at, 49
Columns of "Colonnade Hotel." Proposal to use the, 42
Coöperative-Apartment Craze of Twenty Years ago, 97
Dwellings. Costly Ready-made, 57
Electrolier Competition, 66
Elevator Accidents. Two, 88
Fire-escapes for Hotels, 81
Horgan & Slattery Contracts. The, 10
" " " The "Exuberance" of Messrs., 23
London District Surveyor System would afford Relief to Department of Buildings, 41
Real-estate Values, 9
Space available for Dwellings of the Wealthy. The Circumscribed, 57
Stables. Decrease in Number of, 103
Statues of Notables as Architectural Embellishment, 66
Subway: How it will cross the Harlem River, 16
Tenement-house Law. Attempts to change the, 9

NEW YORK: —
Theatres. Laws to be enforced regarding, 17
Water-leakage, 8

Notes on Iron and Steel Construction, 3, 67, 99

— O —

OBITUARY: —
Constant. J. J. Benjamin, Painter, 74
Dalou, Jules, Sculptor, 26
Lord. James Brown, Architect, 74
Snead. W. R., Pres. Snead & Co., Iron Works, 16
Swain. Edward R., Architect, 47

Office-building. Present Rage for Syndicate, 97
Old-age Pensions. German, 104
Old Wood-carvings, 104
Onyx found in Arizona. Deposit of White, 88
Operative. The Status of Lowell Mill, 90, 103
Orientation of Churches. Concerning the, 98
Origin and Symbolism of Church Ornaments. The, 98
Ornaments. The Origin and Symbolism of Church, 98

— P —

Panthéon. The Dome of the Paris, 8

PARIS: —
Bénard made Professor at the École des Beaux-Arts. M., 98
Dome of the Panthéon. The, 8
Jottings. A few, 70
Letter from, 93
Louvre Collections and their Exposure to Fire, 17
Salle de Louis. The, 93
Salons. The Annual, 93
Statues in the Streets of, 16
Trees in, 40

Passageways of England. The Underground, 87
Penal-code Section relative to Hours of Labor unconstitutional, 80
Pensions. German Old-age, 104
Philadelphia. Replacing a Bridge-span in, 88
Philæ and the Assuan Dam. The Island of, 72
Pickaxe of tempered Copper. An Ancient, 8
Picture-restoring under Napoleon I., 48
Picture. Wilkins's over-big, 8
Pillars. The Roland, 24
Plea for Women practising Architecture. A, 20
Porous Nailing Brick. A, 90
Postponement of the Louisiana Purchase Exposition, 50
Pratt Institute, Brooklyn, New York. Development of the, 66
Prehistoric Village in Wisconsin. A, 104
Premiums and the Increasing Fire-Tax. The Inequality of Insurance, 89
Preservation of Ancient Italian Monuments. Efforts toward the, 104
Price of Lumber likely to rise, 64
Problems. Color. By Emily Noyes Vanderpoel, 94
Public Buildings. Structural Color-decoration of the Interior of, 30, 38, 53
Puvis de Chavannes as a Caricaturist, 72
Pyramids to be lighted by Electricity, 13

— Q —

Quicksand. A Foundation on, 22

— R —

Railway. Facts about the Trans-Siberian, 58
" Station for Leipsic, Germany. Projected, 58
Range-boiler. Repairing a, 72
Rapid Erection of Steel-frame Buildings, 41
Ready-made Dwellings in New York. Costly, 57
Real-estate. The Approaching Movement in, 25
" " Values in New York and Elsewhere, 9
Reforestation of New Hampshire, 2
Registration of Architects in New Jersey. The, 71
Remodelled Colonial Churches. Some, 37
Repairing a Range-boiler, 72
Repairs to Truro Cathedral, 82
Resignation of Prof. A. B. Trowbridge of College of Architecture, Cornell University, 34
Restoration of the Erechtheum, 88
Restoring Pictures under Napoleon I, 48
Result of lowering the Grade of Mill Operatives, 90, 103
Retiring-age for Workmen, 24

REVIEWS: —
Bricklaying and Brick-cutting. By H. W. Richards, 95
Color Problems. By Emily Noyes Vanderpoel, 94

Right of Way at Stonehenge. The, 88
River's Breadth. To judge a, 16
Road. The Cumberland, 64
Robinson elected Director of Boston Museum of Fine-Arts. Edward, 73
" Travelling-fellowship in Architecture at Harvard University, 33
Rochambeau Statue. A Tariff Tax upon the, 25
Roland Pillars. The, 24
Roman Remains of the Italian Littoral. Submarine, 64
" and Romanesque France, 46
Rotch Travelling Scholar. The new, 58
Royal Gold Medal and the late Mr. Bentley, 42
" Road, California. The, 8
Rulings. Some Court Labor, 96
Russia. The Forests of, 88
Rust? Will Insurance Companies insure against, 41
Rusting of inserted Iron causes Splitting of Stone, and Accidents sometimes result, 2

— S —

St. Louis Exposition. Municipal Art Society of N. Y. and the proposed "Model City" at the, 17
" " " Postponement of the, 50
St. Paul's, London. Incrustation on, 88, 95
" " " lighted by Electricity, 16
Sale to Foreigners of Works of Art. Italian Government to enforce Law forbidding, 24
Salle de Louis, Paris, France. The, 93
Salons. The Annual, 93
School-house Ventilation in New York. Legislating for, 1

SANITARY: —
Sewerage-system of the City of Mexico, 47
Ventilation of N. Y. School-houses. Legislating for the, 1

Scholar. The new Rotch Travelling, 58
School-children. Effect of desirable Surroundings upon, 33
School-houses of Boston and the Cost of Janitor Service, 33
School of Insurance Engineering. Proposed, 50
Sculptural Adornment of Buildings. Utilizing American Notables for, 66
Sea-water. Curious Effect of Chemicals on, 24
Sewerage-system of the City of Mexico, 47
Shanghai, 11, 43, 51
Shaw Monument, Boston. A Criticism of the, 85
Shell a Model for a Spiral Staircase, 88
Ship-building Congress to be held at Düsseldorf. The, 58
Signs. A Collection of Tavern, 16
" for the Coronation. A Revival of Street, 48
Sketches in China. Journal, 11, 43, 51, 61, 75, 83
Sleeping custom. A Japanese, 88
Smith's Warning about Steel-skeleton Buildings. General Sooy, 29
Snead, President Snead & Co. Iron-works. Death of W. R., 16
Socialism. Municipal, 70
Soil for Central Park, N. Y. C. Reported Need of fresh, 66
Soudan. Christian Antiquities in the, 96
Space available for Dwellings of the Wealthy in New York. The Circumscribed, 57
Speed of Underground Streams, 32
Spiral Stairs. Conchology and, 88
Stables in New York City. Decrease in Number of, 103
Staging in Westminster Abbey. Danger from Wooden, 23
Staircase of Leonardo da Vinci modelled after a Shell, 88
Stairway at Copan, Honduras. The Great, 2
Stalls for Westminster Cathedral. Canons', 24
State-house. Enlargement of the Maryland, 57
Station for Leipsic, Ger. Projected Railway, 58
Statue. Competition for the McClellan, 32
" Craze. The, 48
" of General Rochambeau. The Duty levied upon Gift to this Country of a, 25
Statues. The *Builder* on American Taste in Colossal, 81
" of New York Notables as Architectural Embellishments, 66
" in the Paris Streets, 16
Status of the Lowell Mill-operative. The, 90, 103
Steel and Concrete Structures. Differing Expert Statements concerning, 50
" Construction. Notes on Iron and, 3, 67, 99
Steel-frame Buildings. Experiment Station to Study Construction of, 65
" " General Sooy Smith's Warning about, 29
" " Rapid Erection of, 41
" " Rust and, 41
Steel Frame. Efflorescence upon Brickwork an Indication of Danger to enclosed, 65
Steps at Doorways, 56
Stonehenge. The "Right of Way" at, 88
Stoppings. Colored Wax, 86
Streams. Speed of Underground, 32
Street-area of some of the principal Cities, 72
Street-signs for the Coronation. A Revival of, 48
Structural Color-decoration of the Interior of Public Buildings, 30, 38, 53
"Structure" may be a Vessel in Course of Construction. A, 32
Subdivision of Space in Buildings, 41
Submarine Roman Remains of the Italian Littoral, 64
Subway, New York. Accident to Contractor of, 97
" " " How it will cross the Harlem River, 16
Swain, Architect. Death of Edward R., 47
Swiss Contribution to Harvard's new Germanic Museum, 10
Symbolism of Church Ornaments. The Origin and, 98
Syndicate Building. Present Rage for, 97

— T —

Tariff Tax upon La Fayette Relics intended for Congressional Library. The, 25
" " " Gift to this Country of a Statue of Admiral Rochambeau, 25
" on some Works of Art. An attempt to remove, 66
Tavern Signs. A Collection of, 16
Technology to move some of its Departments to Brookline, Mass. Institute of, 49
Tempered Copper Pickaxe. An ancient, 8
Tenement-house Law. Attempts to change the N. Y., 9
Tenement-houses a Benefit to the Social Body Politic. Good, 9
Tenements not Apartment-houses, 8
Test of Acetylene Generators, 32
Theatres. Infractions of the Law by New York, 17
Trade-unions and the Apprenticeship Question, 82
Trans-Siberian Railroad. Facts about the, 58
Travelling-fellowship in Architecture at Harvard University. The Robinson, 33
Trees in Paris, 40
Trowbridge resigns from College of Architecture, Cornell University, Prof. A. B., 34
Truro Cathedral Repairs, 82
"Trust" Prices. The Laboring Man's Interest in, 25
Trust. The reported Whitewood, 25
Trusts in America and Abroad, 90
" Crops and Dividends, 81
Tudor Period, 27
Tunnels. Ventilating London's, 103

— U —

Underground Passageways of England. The, 87
" Streams. The Speed of, 32
Unionism. More Vagaries of, 20
Unknown Bernini. The, 19

— V —

Vagaries of Unionism. More, 20
Valençay, France, 48
Ventilating London's Tunnels, 103
Ventilation of N. Y. School-houses. Legislating for the, 1
Vignola. The American, 35
Village in Wisconsin. A Prehistoric, 104
Volute of the Ionic Capital. The, 50
Voronikhin, the Russian Architect, 80

— W —

Wages in Chicago. Demand for Higher, 29
Walls of Avignon. Partial Demolition of the, 42
Warehouse Fires in the Barbican, London, 89
Warning to Architects invited to give Bonds. A Massachusetts, 65

WASHINGTON, D. C.: —
Grant Monument Competition Discussion. The, 26, 34
McClellan Statue Competition, 32
Memorial to Abraham Lincoln. The proposed, 97

Waterfall (artificial) in Europe. Highest, 58
Water-leakage in New York City, 8
Wax Stoppings. Colored, 86
Westminster Abbey. Danger from Wooden Staging in, 23
" Cathedral. Canons' Stalls for, 24
White Onyx Deposit in Arizona, 88
Whitewood Trust. The reported, 25
Widest Streets. The, 72
Width of a River. To judge the, 16
Wilkins's over-big Battle-piece, 8
Wind Cave, South Dakota, 80
Women practising Architecture. A Plea for, 20
Wood-carvings. Old, 104
Workingman's Interest in "Trust" Prices. The, 25
Workmen. The Retiring age for, 24
Works of Art. Attempt to remove Tariff on some, 66
" " " Italian Government to enforce Law forbidding Sale to Foreigners of valuable, 24

— Y —

Yucatan. Archæological Research in, 18

— Z —

Zapotecas. Discovery of a City of the, 32
Zoölogical Gardens of Berlin. The, 26

ILLUSTRATIONS.

[*The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation. The abbreviation "Adv." denotes that the illustration was published on an advertising page, common to both the editions.*]

APARTMENT-HOUSES.

Apartment-house, New York, N Y. Horgan & Slattery, Archts., 1372 (*Reg.*)

CLUB-HOUSES.

Club-house for the Smith and Wesson Shooting-range, Springfield, Mass. G. W. Taylor, Archt., 1375 (*Adv.*)

DETAILS.

Candelabra, New York, N. Y., 1371 (*Int.*)

Church Doorways, Le-Mesnil-St.-Denis, France, 1371 (*Int.*)

Details of Interior Treatment of the House of Colonel Guffey, Pittsburgh, Pa.: 6 Plates. G. T. Pearson, Archt., 1371 (*Int.*)

" in Pyrenées Orientales, France, 1378 (*Reg.*)

Doorway at Beauvais, France, 1371 (*Int.*)

" Palazzo Brancoli-Busdraghi, Lucca, Italy. Doorway: Palazzo Cittadella, Lucca, Italy, 1373 (*Adv.*)

" at Provins, France, 1371 (*Int.*)

Entrance to No. 918 West End Avenue, New York, N. Y. Horgan & Slattery, Archts., 1372 (*Reg.*)

" Porch, 409 Commonwealth Ave., Boston. Peabody & Stearns, Archts., 1379 ((*Reg.*)

" Portico: Field Memorial Library, Conway, Mass. Shepley, Rutan & Coolidge, Archts., 1371 (*Int.*)

Exterior Details U. S. Court-house and Post-office, Salt Lake City, Utah. J. K. Taylor, Supervising Archt., 1381 (*Reg.*)

House of Giraud Foster, Esq., Lenox, Mass. Carrère & Hastings, Archts.: —

Fireplace in Living-room, 1371 (*Int.*)

Mantelpiece in Main Hall, 1371 (*Int.*)

Palm-house Entrance, 1371 (*Int.*)

Transept Door, Cathedral of Coutances, Manche, France, 1371 (*Int.*)

"Wheatleigh": House of H. H. Cook, Esq., Lenox, Mass. Peabody & Stearns, Archts.: —

Gate-post, 1371 (*Int.*)

Main Entrance, 1371 (*Int.*)

Rear Entrance-arcade, 1371 (*Int.*)

Terra-cotta Details, 1371 (*Reg.*)

XVI-Century Porch, Ronquerolles, Seine-et-Oise, France, 1374 (*Adv.*)

DWELLINGS.

Bramhall Hall, Alderly Edge, England, 1378 (*Reg.*)

" " Cheshire, Eng., 1378 (*Reg.*)

Brereton Hall, near Congleton, Cheshire, England, 1378 (*Reg.*)

Château de Clambeau, Nievre, France. M. Narjoux, Archt., 1371 (*Adv.*)

Details of Interior Treatment of the House of Colonel Guffey, Pittsburgh, Pa.: 6 Plates. G. T. Pearson, Archt., 1371 (*Int.*)

Dormitory for Kenyon College, Gambier, O. C. F. Schweinfurth, Archt., 1383 (*Reg.*)

"Elm Court": House of W. D. Sloane, Esq., Lenox, Mass. Peabody & Stearns, Archts., 1371 (*Int.*): —

Entrance-front, 1371 (*Int.*)

New Front, 1371 (*Int.*)

Side Entrance, 1371 (*Int.*)

Hampton Court Palace, England: The Great Hall, 1374 (*Reg.*)

Hanna Hall, Kenyon College, Gambier, O. C. F. Schweinfurth, Archt., 1383 (*Reg.*)

Hardwick Hall, England, 1378 (*Reg.*)

House of J. B. Castle, Esq., Honolulu, Hawaii. O. G. Traphagen, Archt., 1383 (*Reg.*): —

Parlor, 1383 (*Adv.*)

Staircase, 1383 (*Reg.*)

House of Giraud Foster, Esq., Lenox, Mass. Carrère & Hastings, Archts.: —

Corner of Parlor, 1371 (*Int.*)

Den, 1371 (*Int.*)

Dining-room, 1371 (*Int.*)

Fireplace in Living-room, 1371 (*Int.*)

(*Dwellings Continued.*)

House of Giraud Foster, Esq., Lenox, Mass. Carrère & Hastings, Archts: —

Fireplace-end of Parlor, 1371 *Int.*)

Living-room, 1371 (*Int.*)

Main Hall, 1371 (*Int.*)

" Staircase, 1371 (*Int.*)

Mantelpiece in Main Hall, 1371 (*Int.*)

Palm-house, 1371 (*Int.*)

" Entrance, 1371 (*Int.*)

Second-floor Sitting-room, 1371 (*Int.*)

South Front, 1371 (*Int.*)

Vestibule, 1371 (*Int.*)

Kirby Hall, England. South Side of Courtyard, 1378 (*Reg.*)

No. 409 Commonwealth Ave., Boston, Mass. Peabody & Stearns, Archts., 1379 (*Reg.*): —

Entrance-porch, 1379 (*Reg.*)

" 918 West End Avenue, New York City. Horgan & Slattery, Archts., 1372 (*Reg.*): —

Entrance to Same, 1372 (*Reg.*)

St. Catherine's, near Bath, England, 1378 (*Reg.*)

Villa Hofmann, Mannheim, Baden, 1381 (*Adv.*)

"Wheatleigh": House of H. H. Cook, Esq., Lenox, Mass. Peabody & Stearns, Archts.: —

Entrance-front, 1371 (*Int.*)

Garden Front, 1371 (*Int.*)

Gate-post, 1371 (*Int.*)

Lawn Front, 1371 (*Int.*)

Main Entrance, 1371 (*Int.*)

Preliminary Study, 1371 (*Reg.*)

Rear Entrance-arcade, 1371 (*Int.*)

Side View, 1371 (*Int.*)

Tentative Sketches, 1371 (*Reg.*)

Terra-cotta Details, 1371 (*Reg.*)

Wollaton House, England, 1378 (*Reg.*)

Worsley Old Hall, Manchester, England, 1378 (*Reg.*)

Abbaye de la Luzerne, St. Pierre-Langers, Manche, France, 1371 (*Int.*)

ECCLESIASTICAL.

Chapel of the Sorbonne, Paris. Jacques Lemercier, Archt., 1371 (*Int.*)

Church at Berzy-le-Sec, near Soissons, France, 1371 (*Int.*)

" " Braine, France, 1371 (*Int.*)

" " Frouville, France, 1371 (*Int.*)

" " Vailly, Aisne, France, 1371 (*Int.*)

" " Vasseny, near Soissons, France, 1371 (*Int.*)

" Doorways, Le-Mesnil-St.-Denis, France, 1371 (*Int.*)

First Baptist Church, Arlington, Mass. C. B. Dunham, Archt., 1379 (*Reg.*)

Notre Dame de Fourvière and the Church of St. Jean, Lyons, France, 1376 (*Reg.*): —

Interior of Notre Dame de Fourvière, 1376 (*Reg.*)

Proposed First Presbyterian Church, Homestead, Pa. E. G. W. Dietrich, Archt., 1382 (*Reg.*)

Remodelled Colonial Churches: 3 Plates. E. C. & G. C. Gardner, Archts., 1375 (*Reg.*)

St. Martin d'Ainay, Lyons, France, 1376 (*Reg.*)

" Paul's, Lyons, France, 1376 (*Reg.*)

Transept Door: Cathedral of Coutances, Manche, France, 1371 (*Int.*)

EDUCATIONAL.

Birmingham University, Birmingham, Eng. Aston Webb and E. I. Bell, Archts., 1381 (*Reg.*)

Dormitory for Kenyon College, Gambier, O. C. F. Schweinfurth, Archt., 1383 (*Reg.*)

Hanna Hall, Kenyon College, Gambier, O. C. F. Schweinfurth, Archt., 1383 (*Reg.*)

Harvard Union, Harvard University, Cambridge, Mass. McKim, Mead & White, Archts.: —

East End of Living-room, 1371 (*Int.*)

Rear View, 1371 (*Int.*)

West End of Living-room, 1371 (*Int.*)

(*Educational Continued.*)

Private School-house, Boston, Mass. W. W. Lewis, Archt., 1374 (*Reg.*)

FOUNTAINS.

Fountain of St. Sulpice, Paris. L. T. J. Visconti, Archt., 1371 (*Int.*)

Pan-American Exposition, Buffalo: Base of "Fountain of Nature." G. T. Brewster, Sculptor, 1371 (*Int.*): —

The "Fountain of Man." Charles Grafly, Sculptor, 1371 (*Int.*)

" " "Nature." G. T. Brewster, Sculptor, 1371 (*Int.*)

" "Struggle for Existence." Enid Yandell, Sculptor, 1371 (*Int.*)

INTERIORS.

Château de Clambeau, Nievre, France. M. Narjoux, Archt., 1371 (*Adv.*)

Delivery-room: Field Memorial Library, Conway, Mass. Shepley, Rutan & Coolidge, Archts., 1371 (*Int.*)

Harvard Union, Harvard University, Cambridge, Mass. McKim, Mead & White, Archts.: —

East End of Living-room, 1371 (*Int.*)

West End of Living-room, 1371 (*Int.*)

House of J. B. Castle, Esq., Honolulu, Hawaii. O. G. Traphagen, Archt.: —

Parlor, 1383 (*Adv.*)

Staircase, 1383 (*Adv.*)

House of Giraud Foster, Esq., Lenox, Mass. Carrère & Hastings, Archts.: —

Corner of Parlor, 1371 (*Int.*)

Den, 1371 (*Int.*)

Dining-room, 1371 (*Int.*)

Fireplace in Living-room, 1371 (*Int.*)

" End of Parlor, 1371 (*Int.*)

Living-room, 1371 (*Int.*)

Main Hall, 1371 (*Int.*)

" Staircase, 1371 (*Int.*)

Mantelpiece in Main Hall, 1371 (*Int.*)

Palm House, 1371 (*Int.*)

Second-floor Sitting-room, 1371 (*Int.*)

Vestibule, 1371 (*Int.*)

Office-lobby: Hackfeld Building, Honolulu, Hawaii. O. G. Traphagen, Archt., 1382 (*Reg.*)

LIBRARIES.

Field Memorial Library, Conway, Mass. Shepley, Rutan & Coolidge, Archts., 1371 (*Int.*): —

Delivery-room, 1371 (*Int.*)

Entrance Portico, 1371 (*Int.*)

Stewart-Haskell Free Library, Derby Line, Rock Island, Vt. J. T. Ball and G. H. Smith, Archts., 1382 (*Reg.*)

MERCANTILE.

Hackfeld Building, Honolulu, Hawaii. O. G. Traphagen, Archt., 1382 (*Reg.*): —

Office-lobby, 1382 (*Reg.*)

National Bank of Commerce Building, St. Louis, Mo. I. S. Taylor, Archt., 1380 (*Reg.*)

Store of R. H. Macy & Co., New York, N. Y. DeLemos & Cordes, Archts., 1376 (*Reg.*)

MISCELLANEOUS.

Big Tree Swimming Pool, Cambridge, Mass. R. C. Sturgis, Archt., 1374 (*Reg.*)

Boat-house in Wade Park, Cleveland, Ohio. C. F. Schweinfurth, Archt., 1374 (*Reg.*)

Candelabra, New York, N. Y., 1371 (*Int.*)

Colonnade of the Louvre and Frémiet's Statue of Velasquez, Paris, 1371 (*Int.*)

Design for new Organ Gallery and Case in the Chapel, Haileybury College, England, 1380 (*Adv.*)

Details in Pyrenées Orientales, France, 1378 (*Reg.*)

Isometric Study: View of Gardens, House for T. B. Fitzpatrick, Esq., Brookline, Mass., 1383 (*Adv.*)

(*Miscellaneous Continued.*)

Pan-American Exposition, Buffalo: Electric Tower. J. G. Howard, Archt., 1371 (*Int.*): —

Ethnology Building. George Cary, Archt., 1377 (*Adv.*)

Pavilion of Manufactures Building. Shepley, Rutan & Coolidge, Archts., 1371 (*Int.*)

Pergola. Carrère & Hastings, Archts., 1379 (*Adv.*)

Propylæa, from the Sunken Garden, 1379 (*Adv.*)

Temple of Music, from the Court of Lilies. Esenwein & Johnson, Archts., 1377 (*Adv.*)

Termes and Electric Candelabra in the Sunken Garden, 1371 (*Int.*)

Terrace of the Propylæa. Babb, Cook & Willard, Archts., 1371 (*Int.*)

Triumphal Causeway. Carrère & Hastings, Archts.; Karl Bitter, Sculptor, 1371 (*Int.*)

Public Pumps, Louvain, Belgium, 1372 (*Adv.*)

Restoration of the Salle de Louis, in the Palais Royal, Paris. A. By MM. Paul Gaudet and Charles Prudent, 1382 (*Reg.*)

Views in Lyons, France, 1376 (*Reg.*)

MONUMENTAL.

Commemorative Monument, Chartres, France. H. P. Nenot, Archt., 1376 (*Adv.*)

Competitive Design for the Soldiers' and Sailors' Monument, Philadelphia, Pa. Elliott Lynch, Archt.: Fernando Miranda, Sculptor, 1383 (*Reg.*)

Funerary Chapel, Paris, France. H. Boitel, Archt., 1382 (*Adv.*)

" Monument, Bougé-Chambalud, Isère, France. E. Jaudelle, Archt., 1376 (*Adv.*)

"The Medicine Man." Paris Exposition of 1900. C. E. Dallin, Sculptor, 1371 (*Int.*)

Monument to Edouard Remy, Louvain, Belgium. P. Bräcke, Sculptor, 1371 (*Int.*)

Pan-American Exposition, Buffalo: —

"The Challenge." C. C. Rumsey, Sculptor, 1371 (*Int.*)

" Chariot Race." F. G. Roth, Sculptor, 1371 (*Int.*)

"Football Player." Douglass Tilden, Sculptor, 1378 (*Reg.*)

"Gen. W. T. Sherman." A. St. Gaudens, Sculptor, 1371 (*Int.*)

"Michael Angelo." Paul W. Bartlett, Sculptor, 1378 (*Reg.*)

Vase and Diana Trivia, 1378 (*Adv.*)

Statue of "Helvetia," Zurich, Switzerland. Richard Kissling, Sculptor, 1371 (*Reg.*)

Statues from the Maximilian Tomb, Innsprück, Austrian Tyrol: 11 Plates. 1371 (*Int.*)

OFFICE-BUILDINGS.

Design for the Albany Building Chambers, Albany, N. Y. E. W. Loth and F. R. Comstock, Associated Archts., 1380 (*Reg.*)

PUBLIC BUILDINGS.

Design for City-hall, Newark, N. J. E. A. McMurray & F. R. Comstock, Archts., 1372 (*Reg.*): —

Plans and Section of Same, 1372 (*Reg.*)

Hôtel de Ville, Lyons, France, 1376 (*Reg.*)

U. S. Court-house and Post-office, Indianapolis, Ind. Rankin & Kellogg, Archts. J. K. Taylor, Supervising Archt., 1377 (*Reg.*): —

Detail of Entrance Pavilion, 1377 (*Reg.*)

" " Main Colonnade, 1377 (*Reg.*)

Front and Rear Elevations, 1377 (*Reg.*)

(*Public Buildings Continued.*)
U. S. Court-house and Post-office: —
Salt Lake City, Utah. J. K. Taylor, Supervising Archt., 1381 (*Reg.*): —
Exterior Details, 1381 (*Reg.*)

(*Public Buildings Continued.*)
U. S. Custom-house and Post-office, Brunswick, Ga. J. K. Taylor, Archt., 1373 (*Reg.*): —
Details of Same, 1373 (*Reg.*)
Plans and Section of Same, 1373 (*Reg.*)

THEATRES.
Prince Regent's Theatre, Munich, Bavaria. Heilmann & Sittmann, Archts., 1380 (*Reg.*)

THEATRES AND HALLS.
Restoration of the Salle de Louis, in the Palais Royal, Paris. A. By MM. Paul Gaudet and Charles Prudent, 1382 (*Reg.*)

TEXT CUTS.

[*The figures refer to the page of text, not to the number of the journal.*]

Alley Wall and Cement Water-conductors, Canton, 77
Baby Chair, 52
Baby's High Chair, 62
Back-yard of House, Shanghai, 44
Baskets with Paper to be burned at Grave, 44
Boats on River, Canton, 75
Ceremonial Gateway, Howqua's House, Canton, 76
Chair in which one travels, 62
Compton Wyngate, Warwickshire. Plan of, 28
Courtyard: Private House, Shanghai, 13
Cradle, 52
Device for cleaning Cotton, 52
Dining-room: Private House, Shanghai, 43
Drawing heavy Bow, Canton, 83
Drill-room, Canton, 83
Examination-hall, Canton, 83
Farmhouse near Shanghai, 51
Gateway: Farmhouse near Shanghai, 51
" Native City of Shanghai, 11
" of Village, 85
Haddon Hall: The Entrance, 27
Hengrave Hall, Suffolk. Plan of, 28
Houghton Tower, Lancashire. The Inner Court, 28
Interior of St. Nizier's, Lyons, France, 46
Kitchen, Canton, 63
" Howqua's House, Canton, 76
" Range, Canton, 62
" " Shanghai, 44
" Shrine, Canton, 63
Library: Private House, Shanghai, 43
Lotus Pond, Canton, 77
Old Houses, Warwick, Eng., 60
Palanquin House, Shanghai, 13
Pipes and Mouthpieces, 77
Plaster Cast of Compressed Foot, 63
Potter at Work, 84
Pottery Pedler on Canton River, 52
" Yard, Shanghai, 11
Rice Kettle, Howqua's Kitchen, 76
St. Catherine's, near Bath, Eng., 59
School, Canton, 62
Stringing a Bow, 63
Third Side of Howqua's Kitchen, 76
Toabcco-pipe with Water-receptacle, 77
View from City wall, Canton, 75
" " five-storied Pagoda, Canton, 75
Water-clock, Canton, 78
Writing-table, etc., 43

INDEX BY LOCATION.

[*The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation.*]

— A —

Albany, N. Y. Design for the Albany Building Chambers. E. W. Loth and F. R. Comstock, Associate Archts., 1380 (*Reg.*)
Alderly Edge, Eng. Bramhall Hall, 1378 (*Reg.*)
Arlington, Mass. First Baptist Church. C. B. Dunham, Archt., 1379 (*Reg.*)

— B —

Bath, Eng. St. Catherine's, 1378 (*Reg.*)
Beauvais, France. Doorway, 1371 (*Int.*)
Berzy-le-Sec, near Soissons, France. Church, 1371 (*Int.*)
Birmingham, Eng. Birmingham University. Aston Webb and E. I. Bell, Archts., 1381 (*Reg.*)
BOSTON, MASS.: —
Private School-house. W. W. Lewis, Archt., 1374 (*Reg.*)
409 Commonwealth Ave. Peabody & Stearns, Archts., 1379 (*Reg.*): —
Entrance Porch, 1379 (*Reg.*)
Braine, France. Church, 1371 (*Int.*)
Brookline, Mass. Isometric Study: View of Gardens, House for T. B. Fitzpatrick, Esq., 1383 (*Adv.*)
Brunswick, Ga. U. S. Custom-house and Post-office. J. K. Taylor, Supervising Archt., 1373 (*Reg.*): —
Details of Same, 1373 (*Reg.*)
Plans and Section of Same, 1373 (*Reg.*)
BUFFALO, N. Y.: —
Pan-American Exposition: —
Base of "Fountain of Nature." G. T. Brewster, Sculptor, 1371 (*Int.*)
"The Challenge." C. C. Rumsey, Sculptor, 1371 (*Int.*)
"The Chariot Race." F. G. Roth, Sculptor, 1371 (*Int.*)
Electric Tower. J. G. Howard, Archt., 1371 (*Int.*)

BUFFALO, N. Y.: —
Pan-American Exposition: —
Ethnology Building. George Cary, Archt., 1377 (*Adv.*)
"Foot-ball Player." Douglas Tilden, Sculptor, 1378 (*Reg.*)
The "Fountain of Man." Charles Grafly, Sculptor, 1371 (*Int.*)
The "Fountain of Nature." G. T. Brewster, Sculptor, 1371 (*Int.*)
"Gen. W. T. Sherman." A. St. Gaudens, Sculptor, 1371 (*Int.*)
"Michael Angelo." Paul W. Bartlett, Sculptor, 1378 (*Reg.*)
Pavilion of Manufactures Building. Shepley, Rutan & Coolidge, Archts., 1371 (*Int.*)
Pergola. Carrère & Hastings, Archts., 1379
Propylæa, from the Sunken Garden, 1379 (*Adv.*)
"The Struggle of Existence." Enid Yandell, Sculptor, 1371 (*Int.*)
Temple of Music, from the Court of Lilies. Esenwein & Johnson, Archts., 1377 (*Adv.*)
Termes and Electric Candelabra in the Sunken Garden, 1371 (*Int.*)
Terrace of the Propylæa. Babb, Cook & Willard, Archts., 1371 (*Int.*)
Triumphal Causeway. Carrère & Hastings, Archts.; Karl Bitter, Sculptor, 1371 (*Int.*)
Vase and Diana Trivia, 1378 (*Adv.*)

— C —

Cambridge, Mass. Big Tree Swimming-pool. R. C. Sturgis, Archt., 1374 (*Reg.*)
" " Harvard Union, Harvard University. McKim, Mead & White, Archts.: —
East End of Living-room, 1371 (*Int.*)
Cambridge, Mass. Harvard Union, Harvard University. McKim, Mead & White, Archts.: —
Rear View, 1371 (*Int.*)
West End of Living-room, 1371 (*Int.*)
Chartres, France. Commemorative Monument. H. P. Nenot, Archt., 1376 (*Adv.*)
Cheshire, Eng. Bramhall Hall, 1378 (*Reg.*)
Cleveland, O. Boat-house in Wade Park. C. F. Schweinfurth, Archt., 1374 (*Reg.*)
Congleton, Cheshire, Eng. Brereton Hall, 1378 (*Reg.*)
Conway, Mass. Field Memorial Library. Shepley, Rutan & Coolidge, Archts., 1371 (*Int.*): —
Delivery-room, 1371 (*Int.*)
Entrance Portico, 1371 (*Int.*)

— D —

Derby Line, Rock Island, Vt. Stewart-Haskell Free Library. J. T. Ball and G. H. Smith, Archts., 1382 (*Reg.*)

— E —

England. Hampton Court Palace: The Great Hall, 1374 (*Reg.*)
" Hardwick Hall, 1378 (*Reg.*)
" Kirby Hall: South Side of Courtyard, 1378 (*Reg.*)
" Wollaton House, 1378 (*Reg.*)

— F —

France. Details in Pyrenées Orientales, 1378 (*Reg.*)
Frouville, France. Church, 1371 (*Int.*)

— G —

Gambier, O. Dormitory for Kenyon College. C. F. Schweinfurth, Archt., 1383 (*Reg.*)
" " Hanna Hall, Kenyon College. C. F. Schweinfurth, Archt., 1382 (*Reg.*)

— H —

Haileybury College, England. Design for new Organ-gallery and Case in the Chapel, 1380 (*Adv.*)
Homestead, Pa. Proposed First Presbyterian Church. E. G. W. Dietrich, Archt., 1382 (*Reg.*)
Honolulu, Hawaii. Hackfeld Building. O. G. Traphagen, Archt., 1382 (*Reg.*): —
Office-lobby, 1382 (*Reg.*)
" " House of J. B. Castle, Esq. O. G. Traphagen, Archt., 1383 (*Reg.*): —
Parlor, 1383 (*Adv.*)
Staircase, 1383 (*Reg.*)

— I —

Indianapolis, Ind. U. S. Court-house and Post-office. Rankin & Kellogg, Archts. J. K. Taylor, Supervising Archt., 1377 (*Reg.*): —
Detail of Entrance Pavilion, 1377 (*Reg.*)
" " Main Colonnade, 1377 (*Reg.*)
Front and Rear Elevations, 1377 (*Reg.*)
Innsprück, Austrian Tyrol. Statues from the Maximilian Tomb: 11 Plates, 1371 (*Int.*)
Isère, France. Funerary Monument, Bouge-Chambalud. E. Jaudelle, Archt., 1376 (*Adv.*)

— L —

Le-Mesnil-St.-Denis, France. Church Doorways, 1371 (*Int.*)

LENOX, MASS.:—

"Elm Court," House of W. D. Sloane, Esq. Peabody & Stearns, Archts., 1371 (*Int.*):—

Entrance Front, 1371 (*Int.*)

New Front, 1371 (*Int.*)

Side Entrance, 1371 (*Int.*)

House of Giraud Foster, Esq. Carrère & Hastings, Archts.:—

Corner of Parlor, 1371 (*Int.*)

Den, 1371 (*Int.*)

Dining-room, 1371 (*Int.*)

Fireplace in Living-room, 1371 (*Int.*)

" End of Parlor, 1371 (*Int.*)

Living-room, 1371 (*Int.*)

Main Hall, 1371 (*Int.*)

" Staircase, 1371 (*Int.*)

Mantlepiece in Main Hall, 1371 (*Int.*)

Palm-house, 1371 (*Int.*)

" Entrance, 1371 (*Int.*)

Second-floor Sitting-room, 1371 (*Int.*)

South Front, 1371 (*Int.*)

Vestibule, 1371 (*Int.*)

"Wheatleigh," House of H. H. Cook, Esq. Peabody & Stearns, Archts.:—

Entrance Front, 1371 (*Int.*)

Garden Front, 1371 (*Int.*)

Gate-post, 1371 (*Int.*)

Lawn Front, 1371 (*Int.*)

Main Entrance, 1371 (*Int.*)

Preliminary Study, 1371 (*Reg.*)

Rear Entrance-arcade, 1371 (*Int.*)

Side View, 1371 (*Int.*)

Tentative Sketches, 1371 (*Reg.*)

Terra-cotta Details, 1371 (*Reg.*)

Louvain, Belgium. Monument to Edouard Remy. P. Braecke, Sculptor, 1371 (*Int.*)

" " Public Pumps, 1372 (*Adv.*)

Lucca, Italy. Doorway: Palazzo Brancoli-Busdraghi. Doorway: Palazzo Cittadella, 1373 (*Adv.*)

Lyons, France. Hôtel de Ville, 1376 (*Reg.*)

" " Notre Dame de Fourvière and the Church of St. Jean, 1376 (*Reg.*):—

Interior of Notre Dame de Fourvière, 1376 (*Reg.*)

" " Palais de Justice and the Slope of Fourvière, 1376 (*Reg.*)

" " Place Bellecour, 1376 (*Reg.*)

" " St. Martin d'Ainay, 1376 (*Reg.*)

" " " Paul's, 1376 (*Reg.*)

— M —

Manche, France. Abbaye de la Luzerne, St. Pierre-Langers, 1371 (*Int.*)

" " Transept Door, Cathedral of Coutances, 1371 (*Int.*)

Manchester, Eng. Worseley Old Hall, 1378 (*Reg.*)

Mannheim, Baden. Villa Hofmann, 1381 (*Adv.*)

Marietta, O. Remodelled Congregational Church. E. C. & G. C. Gardner, Archts., 1375 (*Reg.*)

Munich, Bavaria. Prince Regent's Theatre. Heilmann & Sittmann, Archts., 1380 (*Reg.*)

— N —

Newark, N. J. Design for City-hall. E. A. McMurray and F. R. Comstock, Archts., 1372 (*Reg.*):—

Plans and Section of Same, 1372 (*Reg.*)

NEW YORK, N. Y.:—

Apartment-house. Horgan & Slattery, Archts., 1372 (*Reg.*)

Candelabra, 1371 (*Int.*)

No. 918 West End Ave. Horgan & Slattery, Archts., 1372 (*Reg.*):—

Entrance to Same, 1372 (*Reg.*)

Store of R. H. Macy & Co. DeLemos & Cordes, Archts., 1376 (*Reg.*)

Nièvre, France. Château de Clambeau. M. Narjoux, Archt., 1371 (*Adv.*)

— P —

PARIS, FRANCE:—

Chapel of the Sorbonne. Jacques Lemercier, Archt., 1371 (*Int.*)

Colonnade of the Louvre and Frémiet's Statue of Velasquez, 1371 (*Int.*)

Fountain of St. Sulpice. L. T. J. Visconti, Archt., 1371 (*Int.*)

Funerary Chapel. H. Boitel, Archt., 1382 (*Adv.*)

"The Medicine Man." Exposition of 1900. C. E. Dallin, Sculptor, 1371 (*Int.*)

Restoration of the Salle de Louis, in the Palais Royal. A. By MM. Paul Gaudet and Charles Prudent, 1382 (*Reg.*)

PHILADELPHIA, PA.:—

Competitive Design for the Soldiers' and Sailors' Monument. Elliott Lynch, Archt. Fernando Miranda, Sculptor, 1383 (*Reg.*)

Pittsburgh, Pa. Details of Interior Treatment of the House of Colonel Guffey: 6 Plates. G. T. Pearson, Archt., 1371 (*Int.*)

Provins, France. Doorway, 1371 (*Int.*)

— S —

St. Louis, Mo. National Bank of Commerce Building. I. S. Taylor, Archt., 1380 (*Reg.*)

Salt Lake City, Utah. U. S. Court-house and Post-office. J. K. Taylor, Supervising Archt., 1381 (*Reg.*):—

Exterior Details, 1381 (*Reg.*)

Seine-et-Oise, France. XVI-Century Porch, Ronquerolles, 1374 (*Adv.*)

Springfield, Mass. Club-house for the Smith and Wesson Shooting-range. G. W. Taylor, Archt., 1375 (*Adv.*)

— V —

Vailly, Aisne, France. Church, 1371 (*Int.*)

Vasseny, near Soissons, France. Church, 1371 (*Int.*)

— W —

Ware, Mass. Remodelled Congregational Church. Gardner, Pyne & Gardner, Archts., 1375 (*Reg.*)

Williamsburg, Mass. Remodelled Congregational Church. Gardner, Pyne & Gardner, Archts., 1375 (*Reg.*)

— Z —

Zurich, Switzerland. Statue of "Helvetia." Richard Kissling, Sculptor, 1371 (*Reg.*)

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL LXXVII

JULY-SEPTEMBER

* 1902 *

BOSTON

AMERICAN ARCHITECT AND BUILDING NEWS CO.

211 TREMONT STREET

HELIOTYPE

L.S. IPSEN, DEL.

S. J. Parkhill & Co., Printers
Boston, U. S. A.

INDEX TO VOLUME LXXVII.

JULY — SEPTEMBER, 1902.

Academy. The British, 80
" of Design, New York. Free Tuition in the National, 2

ACCIDENTS: —
Fall of Building in Pittsburgh, Pa., 49
" " the Tower of St. Mark, Venice, 17, 25, 41, 46, 47, 50, 61

Advertising. House-front, 82
Advocacy of Trade Schools, 33
Æolian Larissa. Excavations on the Site of the, 18
Alcohol. Lighting by Means of, 72
" as a Motive Power, 49
Aluminium. Increased Use of, 86
" as a Substitute for Copper, 80
American Artists residing Abroad. Free Entry allowed Works of, 1, 15
" Bicycle Co. Projected Reorganization of, 90
A. I. A. (Phil delphia Chapter) compelled to restore Mr. Addison Hutton to Membership, 81
American Stone-production, 48
" Vignola. The, 51, 83
" Woollen Co. Fraudulent Strike against, 1
Anderson. Studio in New York of A. A., 14

ANECDOTES: —
Ambidexterity. Landseer's, 80
Couture and Dutuit, 86
Whistler as a West Pointer, 8

Angevin Kings. Last Resting-place of the, 101
Animal Locomotion as expressed by early Artists, 88
Anthracite-coal Miners. The present Strike of the, 58, 81, 97
Anthracite Coal. Substitutes for, 58, 64
Antibes, 85
Antipolis, 85
Antique Furniture. Planting, 32
Antiques. Bogus, 72
Appropriations by Congress in Aid of Expositions, 25

ARCHÆOLOGICAL: —
Asia Minor. German Investigations in, 42
Athenian Buildings. Peculiarities of some, 74
Babylonian Tablets at the U. of P., 74
Copan. The Ruins at, 8
Cretan Phæstos, 62
Larissa of Antiquity. Excavations on the Site of, 18
Parthenon. Interior Order of the, 74
Roman Galleys of Lake Nemi. The, 11
Spanish Archæology, 79
Tablet of Mena. The, 88

Architect attacked by a Labor Union, 57
" murdered for condemning a Contractor's Work. French, 2
Architectural Department at Harvard. Curriculum of the, 65
" Fees for Public Work in Paris, 66
Architecture in England during the Middle Ages. Domestic, 75
" The New Style of French, 42
" at this Year's *Salons*, 30
Artesian-well Power, 96
Artificial Clay. German, 40
Art Institute Building, Chicago. Completion of the, 100
" " Chicago. Exhibition of Students' Work at the, 100
" " Juvenile Class at the Chicago, 100
" " Students. Practical Work being done by the Chicago, 100
" New Italian Law on Dealings in, 71
" " Style of, 55
" Nouveau. L', 82
" Is Photography an, 104
Art-study in Italy, 56
Artistic Advertising Signs. Paris Competition for, 50
" Career. Professor Sturgis's Opinion as to proper Training for an, 9
Artists residing Abroad. Free Entry allowed Works of, 1, 15
Artists' (Newspaper) Exhibition in Boston, 98
Artists of small Means. Studios in Paris for, 96
Ashes in New York City. A Saving in the Disposal of, 26
Asia Minor. German Archæological Investigations in, 42
Associations cannot exceed their Charter Rights, 81
Assouan Dam. Completion of the, 50
Athenian Buildings. Peculiarities of some, 74
Atlanta, Ga. Carnegie Library, 43
Australia. Proposed Colossal Statue of, 8
Austrian Insurance against Loss through Strikes, 90
Automobile and Insurance Companies. The, 26
Automobiles. Gasoline, 72
"Avery Hill," Estate of the "Nitrate King," 73

— B —

Babylonian Tablets at the U. of P., 74
Baltimore, Md. A Unique Church at, 16
Barb, 96
Batteries. Storage, 16
Beginning of Building Operations? What constitutes, 88, 95
Bell-towers. Italian, 3
Bequest to the City of Paris. Dutuit, 58
Berlin. Elevated-railway Structures in, 24
Bill-posting Regulations. Prussian, 101
Black-diamond. The, 96
Bogus Antiques, 72
Boiler Explosions and Safety-valves, 73
Boiler-tubes and their Expansion, 26
Books. Technical and Scientific, 13
Borings in the U. S. Deep, 32

BOSTON: —
Elevated Railway. Noise of the, 10, 65
Exhibition by Newspaper Artists, 98
Library. The, 35
M. I. T. Instruction in Engineering at the, 17
" Sanitary Science at the, 1
Navy Yard Labor-union Men discuss Question of additional Holidays, 17

Branch Libraries, 67
Bridge between Cape Breton and Nova Scotia, 16
" Parsons's Plan for relieving Congestion at Brooklyn, 10
" Suggested Moving Sidewalk for Brooklyn, 26
Brindeau. Ornamental Metalwork of P. L., 85
British Academy. The, 80
" Report on our Iron Trade. A, 78
Brooklyn Bridge. Parsons's Plan for relieving Congestion at, 10
" " Suggested Moving Sidewalk for, 26
Brooklyn-New York Tunnel. The Contract for the, 34
Building in Chicago. The increased Cost of, 6
Building-laborers scarce in Chicago, 64
Building Operations: When do they begin, 88, 95
" Use of Steel and Cast-iron in, 10
" Trust. Projected Realty and, 34
Buildings. Coming Competitions for Government, 1
" in Europe. Insecure Condition of many old, 50
" Paper, 104
" of Venice. Investigating Condition of Public, 34

— C —

Cambridge Marshes converted into Parks, 18
Campanile. Italian, 3
" of St. Mark, Venice. Fall of, 17, 25, 41, 46, 47, 50, 61
Canso Bridge. Strait of, 16
Capitol. Enlargement of the U. S., 98
" Interior Decoration of the Pennsylvania, 41
Carnegie Library, Atlanta, Ga., 43
" " Davenport, Ia., 43
Cartel System. The Modern German, 10
Carvers and Stone-cutters. Summer Class for, 41
Cast-iron in Building advocated, 10
Cathedral Competition. The Liverpool, 66
" The Duke of Norfolk's, 56
" " proposed new Front for Milan, 42
" Hereford, 44
" Oxford. Christ Church, 79
" of St. Paul. Stability of the, 88
Causes that may have led to Fall of Tower of St. Mark, 25, 50, 61
Caution as to Gasoline Automobiles, 72
Cement. A Hard, 88
" Trust. Collapse of a German, 72
Chamonix. The Electric Railway to, 74
Charles River Parkway, Cambridge, 18

CHICAGO: —
Art Institute Building. Completion of the, 100
" " Exhibition of Students' Work at the, 100
" " Juvenile Class, 100
" " Students. Practical Work being done by the, 100
Blackstone Memorial Branch Library, 100
Building-circles. Summer Dulness in, 100
Building. Increased Cost of, 6
Building-laborers scarce, 64
Chicago, Fifty Years hence, 30
Fires. Recent disastrous, 6
Fountain. A Patriotic Electric, 100
Iroquois Theatre. 100
Letter from, 6, 100
Marshall Field and *Tribune* Buildings, 7
Tenement-house Ordinance. Proposed new, 6
Washingtonian Home. Condition of the, 6
Water-supply. Pollution of, 89

Christ Church Cathedral, Oxford, 79
Church at Baltimore, Md. Westminster Presbyterian, 16
" Buildings, Hartford. Colt Memorial, 23
" at Patras, Greece. International Competition for a, 90
City-hall Park, New York. Suggested Changes in, 49
Clay. German Artificial, 40
Clerkenwell's Historic Gateway, 8
Clifford's Tower. Restoration of, 64
Coaching on Good Roads, 32
Coal Miners. The present Strike of the Anthracite, 58, 81, 97
" Strike. The, 2
" Substitutes for Anthracite, 58, 64
Collapse of a German Cement Trust, 72
Colt Memorial Buildings, Hartford, 23
Columbia University Library, 28
" " New Department of Fine-Arts at, 9
Combinations. A German System for Protection against, 10
Commercialization of the Professions, 16
Commission. A Question of, 31
Committee. The Lightning Research, 87
Competition for an Electrolier. Result of, 50
" " the Liverpool Cathedral. The, 66
Competitions for Government Buildings. Coming, 1

COMPETITIONS: —
Church at Patras, Greece, 90

COMPETITIONS:—
Monument to Admiral de Ternay at Newport, 34
Philadelphia McKinley Monument, 57
Signs. Artistic Advertising, 50
Competitive Designs for the Franz Josef Museum, Vienna. The, 98
Completion of the Assouan Dam, 50
Concrete. Ferro, 72
" and Steel Elevator. Concerning the Collapse of a, 16
Condition of many old European Buildings. Insecure, 50
" " New York Union Men in 1902, 16
" " Public Buildings of Venice. Investigating, 34
Congestion upon Brooklyn Bridge. Plans to relieve, 10, 26
Congress. Protest against Aid to Expositions by, 25
Congressional Library, Washington, 21
Construction. Notes on Iron and Steel, 19, 91
Contract for the New York-Brooklyn Tunnel, 35
Contracts. Forfeiture Clause in French Building, 42
Cooling a Roof, 40
Copan. The Ruins at, 8
Copper. Aluminium as a Substitute for, 80
Copper-plated Doors, 56
Corporation. The projected Realty and Building, 34
Corporations and Their Chronic Need of Money, 89
Corrosion of Metals encased in Masonry, 17
Cost of Building in Chicago. Increased, 6
" " rebuilding Tower of St. Mark, Venice, 25
Cottonwood Tree in Kansas. Biggest, 88
Couture and Dutuit, 86
Cretan Phæstos, 62
Cure for Electrolysis, 48, 64
Curriculum of the Department of Architecture at Harvard, 65

— D —

Dallin's "Medicine Man," 22
Dalziels. The Days of the, 96
Danger from Electric-lights, 34, 48, 64
Davenport, Ia. Carnegie Library, 43
"David." Michael Angelo's, 72
Da Vinci's Work at the Sforza Castle, Milan, 48
Decaying of the Sphinx, 42
Decline of the Iron Trade in England, 41
Decoration of the Pennsylvania State-house. The Interior, 41
Department of Fine-Arts at Columbia University. The New, 9
Description of the Colt Memorial Buildings, Hartford, 23
Designs for the Franz Josef Museum, Vienna. The competitive, 98
Diamond. The Black, 96
Docks. London, 62
Domestic Architecture in England during the Middle Ages, 75
Doors. Copper-plated, 56
Duke of Norfolk's Cathedral. The, 56
Dulness in Chicago Building-circles. Summer, 100
Duluth Library, 60
Dutuit Bequest to the City of Paris, 58
" and Couture, 86
Duty on Lumber. Need for a Reduction of the, 81
" not charged on Works of American Artists residing abroad, 1, 15

— E —

Early Hours, 95
East Orange Carnegie Library, 60
Electric Railway to Chamonix. The, 74
" Shock: Rules to be observed in resuscitating Victim of, 104
Electrical Installations and Fire-hazards due to Them, 34, 48, 64
Electricity a Material Substance, 38
Electrolier Competition. Result of the, 50
Electrolysis for copper-plating Doors, 56
" Cure for, 48, 64
Elevated Railway. Noise of the Boston, 10, 65
Elevated-railway Structures in Berlin, 24
Elevator of Concrete Cylinders. Concerning Collapse of a Grain, 16
" No Recovery for Death in, 32

ENGINEERING:—
Artesian-well Power, 96
Assouan Dam. Completion of the, 50
Bridge over Strait of Canso, 16
Chicago, Fifty Years hence, 30
Electric Railway to Chamonix. The, 74
Instructions in, at the M. I. T., 17
London Docks, 62
Notes on Iron and Steel Construction, 19, 91
South American Railways, 73
Technical and Scientific Books, 13
Tunnel between New York and Brooklyn. The Contract for the, 34
" " Scotland and Ireland. The proposed, 32

ENGINEERING:—
Tunnelling the Gemmi Pass, Switzerland, 90

England. Decline of the Iron Trade in, 41
" during the Middle Ages Domestic Architecture in, 75
English. Ruskin's, 104
" Statesmen as Gargoyles, 72
Entry to Art Museums, Galleries, etc., in Italy, 56
Esplanade, Cambridge. The, 18
Estate of the "Nitrate King," near London, 73
Excavations on the Site of the Æolian Larissa, 18

EXHIBITIONS:—
International Fire Exhibition, London. The, 58
Exhibition by Newspaper Artists in Boston. The, 98
" of Students' Work at the Art Inst., Chicago, 100
Explosions in Burning Buildings. Smoke, 48
" due to inefficient Safety-valves. Boiler, 73
Expositions and Government Appropriations therefor, 25
Eye-witness on the Fall of St. Mark's Tower. An, 47

— F —

Facts connected with the Westinghouse Building Operations in England, 98
Failure of a Grain-elevator of Concrete Cylinders. Concerning the, 16
Fall of Building in Pittsburgh, Pa., 49
" " the Tower of St. Mark. The, 17, 25, 41, 46, 47, 50, 61
Fall River Library, 59
Fees for Public Work in Paris. Architectural, 66
Ferro-concrete, 72
Fine-Arts Department at Columbia University. The new, 9
Fire Exhibition, London. The coming International, 58
Fire-hazards due to Electrical Installations, 34, 48, 64
Fire-Insurance Companies and the Automobile, 26
Fires in Chicago. Recent disastrous, 6
Fireproofed *vs.* Metal-covered Wood, 26, 49, 89
"Fireproofed Wood." Some recent Tests of, 49, 75
"Fireproof Wood." So-called, 75
Fireproofing Material. Uralite, a new, 80
Flooring. Side-walls endangered by Water-soaked, 57
Forest Commission of New York. Propagation of Trees by, 58
" Extension. Advice given by U. S. Bureau of Forestry through the Division of, 74
Forest-maker. The Hickory Pine as a, 55
Forestry Movement. Growth of the, 50
Forfeiture Clause in French Building Contracts, 42
Fountain, Chicago. A Patriotic Electric, 100
France. Roman and Romanesque, 85
Franqueville's Statues. Pierre de, 72
Fraudulent Strike against American Woollen Co., 1
Free Tuition in the National Academy of Design, New York, 2
Freezing. How to prevent Gas-pipes from, 40
French Architect murdered for Condemning Contractor's Work, 2
" Building Contracts. The Forfeiture Clause in, 42
" Striving after Originality, 42
Front for Milan Cathedral. The proposed new, 42
Furniture. Planting Antique, 32

— G —

Galleys of Lake Nemi. The Roman, 11
Gardens. Scotch, 95
Gargoyles. English Statesmen as, 72
Gas-fixtures and a New York Sneak-thief, 66
Gas-leakage. Danger from, 32, 33
Gas-mains. Pipe-conduits and leaking, 33
Gas-pipes. To prevent the Freezing of, 40
Gasoline Automobiles, 72
Gateway. Clerkenwell's Historic, 8
Gemmi Pass, Switzerland. Tunnelling the, 90
Geological Formations. Similarity between Standard Patterns and, 88
"Georgian Period." Further Contributions desirable to "The," 65
German Archæological Investigations in Asia Minor, 42
" Artificial Clay, 40
" Cartel System. The Modern, 10
" Cement Trust. Collapse of a, 72
" Insurance against Loss through Strikes, 90
Germanic Museum, Nuremberg. The, 79
Germany. Trade-unions in, 16
Glass. Malleable, 104
" Windows. Wire, 99
Government Buildings. Coming Competitions for, 1
" Reclamation and Irrigation of Land, 2
Grain-elevator of Concrete Cylinders. Concerning the Collapse of a, 16
Grey and the British Lion. Earl, 63
Growth of the Forestry Movement, 50
" " Vienna. The, 96

— H —

Hall of Records. Historical Associations with the N. Y., 10
Harrisburg State-house. Interior Decorations of the, 41
Hartford. Colt Memorial Buildings, 23
Harvard's Architectural Department Curriculum, 65
Harvey on the Parthenon and other Athenian Buildings. Mr. Lawrence, 74
Hereford Cathedral, 44
Hermes of Cythera. The, 72
Hickory Pine as a Forest-maker, 55
Historic Gateway at Clerkenwell, London, 8
Historical Associations with N. Y. Hall of Records, 10
Holidays. Some Workingmen object to additional, 17
Hours. Early, 95
House-front Advertising, 82
Hutton to be restored to Membership of Phila. Chapter, A. I. A. Mr. Addison, 81
Hygeia Hotel at Fortress Monroe. Removal of the, 2

— I —

Iceless Refrigerator. An, 80
Importation free of Duty. Works of American Artists residing Abroad allowed, 1, 15
Improvement of New York. General Plan for the, 66
Improvements in Paris. Public, 42
Incandescent-lamp. To increase the Efficiency of the, 64
Incombustible Lifting-sash Window-frames, 7
Incorporation of Trade-unions. The, 41
Industrial Combinations and their Chronic Need of Money, 89
Inst. of Tech. Instruction in Engineering at the Mass., 17
" " " Sanitary Science at the Mass., 1
Institution-building. Tendency toward, 16
Instruction in Engineering at the M. I. T., 17
Insurance Companies and the Automobile, 26
" against Loss through Strikes. German and Austrian, 90
International Competition for a Church at Patras, Greece, 90
" Fire Exhibition, London, 58
Investigating Condition of Public Buildings of Venice, 34
" the Lightning Conductor, 8
Iron encased in Masonry. The Corrosion of, 17
" Market. The, 50
" and Steel Construction. Notes on, 19, 91
" Trade. A British Report on our, 78
" " in England. Decline of the, 41
Iroquois Theatre, Chicago. The, 100
Irrigation and Reclamation of Land, 2
Italian Bell-Towers, 3
" Law on Dealings in Art. The new, 71
Italy. Art-study in, 56

— J —

Judiciary and the Labor Unions, 1
Juvenile Class, Chicago Art Inst. The, 100

— K —

Kansas Cottonwood. Biggest, 88
Kensington Palace, 69
Kings. The Last Resting-place of the Angevin, 101

— L —

Labor Law in New York City declared Unconstitutional. A, 2
Labor-union Men discuss Question of additional Holidays, 17
Labor Union's direct Attack on an Architect. A, 57
" Unions in Germany, 16
" " and the Judiciary, 1
Laborers scarce in Chicago. Building, 64
Landseer's Ambidexterity, 80
Largest School. The, 32
" Tree in the World, 55
Larissa of Antiquity. Excavation on the Site of, 18
Law on Dealings in Art. The new Italian, 71
Leakage. Danger from Gas, 32, 33

LEGAL:—
Death in Elevator. Can't recover for, 32
Early Hours, 95
Italian Law on Art Dealings, 71
Prussian Bill-posting Regulations, 101
Rights of Abutting Owner in Shade Trees on Highway, 57
Sidewalk Vaults must be paid for, 56, 57
Suit against Boston Elevated Railroad Company to recover Damages for Noise, 10, 65

Letter from Chicago, 7, 100
" " Paris, 30
Library, Chicago. The Blackstone Memorial Branch, 100
Libraries in the United States, 21, 27, 35, 43, 59, 67
Lighting by Means of Alcohol, 72
Lightning-conductor. Investigating the, 8
Lightning Research Committee. The, 87
Lightning-rod. The Wane of the, 96
Lightning. Tripartite Stroke of, 96
Lion. Earl Grey and the British, 63
Liverpool Cathedral Competition. The, 66
Locomotion as expressed by Early Artists. Animal, 88
Log-cabin. A Modern, 56

LONDON:—
"Avery Hill," Estate of the "Nitrate King," 73
Docks, 62
International Fire Exhibition. The Coming, 58
Port of, 63
Problems. Vast, 96
Royal Palaces, 69
St. John's Gate, Clerkenwell, 8
" Paul's. The Stability of, 88
Loring, Director Boston Museum of Fine-Arts. Death of Gen. Charles Greely, 65
Lumber Tariff. Need for a reduction of the, 81
" and Timber Products, 8
" Trade moving Southward, 56
Luxembourg Painting: "The Triumph of Napoleon," 104

— M —

McKinley Monument Competition. Philadelphia, 57
Madison, Wis. State Historical Library at, 28
Malleable Glass, 104
Manual Training Schools. In Advocacy of, 33
Masonry-encased Metals. The Corrosion of, 17
M. I. T. Instruction in Engineering at the, 17
" Sanitary Science at the, 1
Material Substance. Electricity a, 38
"Medicine Man." Dallin's, 22
Memorial Buildings, Hartford. Colt, 23
Mena. The Tablet of, 88
Mesdag, Artist. Death of M., 50
Metal-covered Wood. Fireproofed *vs.*, 26, 49, 89
" Wooden Finish, 103
" Woodwork. Objections to, 49
Metalwork of P. L. Brindeau. Ornamental, 85
Methods of Sewage-treatment. Modern, 14
Michael Angelo's "David," 72
Middle Ages. Domestic Architecture in England during the, 75
Milan Cathedral. The new Front for, 42
Miners. Present Strike of the Anthracite-coal, 58, 81, 97
Modern Methods of Sewage-treatment, 14
Monument to Admiral de Ternay at Newport, R. I. Proposed, 34
" Competition. The Philadelphia McKinley, 57
" to Prison-ship Martyrs, Brooklyn, N. Y. Proposed, 24
" erected by the Salesian Fathers overlooking the Bay of Rio di Janeiro, Brazil, 103
" for Sydney Harbor. Proposed, 8
" to Victor Emmanuel. The Roman, 96
Motive Power. Alcohol as a, 48
Moving Sidewalk for Brooklyn Bridge. Suggested, 26
Municipal Art Society of New York and the Street Signs, 66
Museum, Nuremberg. The German, 79
" at Vienna. The Competitive Designs for the Franz Josef, 98

— N —

National Academy of Design, New York. Free Tuition in the, 2
Need for a Reduction of the Lumber Tariff, 81
Nemi. The Roman Galleys of Lake, 11
Newark Public Library, 36
Newspaper Artists' Exhibition in Boston, 98

New Style of Art. The, 55
NEW YORK:—
Branch Libraries, 68
City-hall Park. Suggested Changes in, 49
Columbia University Library, 28
" " The new Department of Fine-Arts at, 9
Electrolier Competition. Result of the, 50
Hall of Records. Historical Associations with, 10
Labor Law. Unconstitutionality of a, 2
Library. The Public, 27
Municipal Art Society and Street Signs, 66
National Academy of Design. Free Tuition in the, 2
New York University Library, 29
Pipe-conduits and leaking Gas-mains, 33
Plan for Improvement of the City, 66
Sidewalk Vault. Suit over, 56, 57
Street-cleaning Department effecting a Saving in the Disposal of Ashes, 26
Studio. A New York, 14
Tunnel between New York and Brooklyn. The Contract for the, 34
Union Men. Condition in 1902 of, 16
" Nitrate King's" Estate, near London, 73
Noise of the Boston Elevated Railway, 10, 65
Notes on Iron and Steel Construction, 19, 91
" " the late Paris Salons, 38
Nouveau. L'Art, 55, 82
Nuremberg. The German Museum at, 79

— O —

OBITUARY:—
Loring. Gen. Charles Greely, Director Boston Museum of Fine-Arts, 65
Mesdag. M., Artist, 50
Runkle. John D. Prof. of Mathematics, M. I. T., 17
Shepherd, Alexander R., Redeemer of Washington, 89
Vibert. M., Artist, 50
Obligations, Professional, 70
Oldest Throne in Europe, 104
Old European Buildings. Insecure Condition of many, 50
Ordinance. The proposed new Chicago Tenement-house, 6
Originality. French striving after, 42
"Originality" in White House Alterations, 29, 31
Ornamental Metalwork of P. L. Brindeau, 85
Owner's Rights in Shade-trees on Highway. The Abutting, 57
Oxford. Christ Church Cathedral at, 79

— P —

Painter *vs.* Photographer, 104
Painting in the Luxembourg: "The Triumph of Napoleon," 104
Palaces of London. Royal, 69
Paper Buildings, 104
PARIS:—
Architectural Fees for Public Work, 66
Dutuit Bequest, 58
Letter from, 30
Public Improvements, 42
Salons. Notes on the late, 38
Smoke Consumption in, 18
Studios for Poor Artists, 96
Parkway. The Charles River, 18
Parsons's Plan for relieving Congestion at Brooklyn Bridge, 10
Parthenon. The Interior Order of the, 74
Patras, Greece. International Competition for a Church at, 90
Patterns and Geological Formations. Similarity between Standard, 88
Pawtucket Library, 59
Peat-bogs of New York. A Use for the, 64
Peculiarities of some Athenian Buildings, 74
Pennsylvania State-house. The Interior Decoration of the, 41
" University Law Library, 29
Permeable Walls, 24
Phæstos. Cretan, 62
PHILADELPHIA:—
McKinley Monument Competition, 57
Pennsylvania University Law Library, 29
Philadelphia Chapter A. I. A. compelled to restore Mr. Addison Hutton to Membership, 81
Philippines. First Steps in the, 24
Photographer *vs.* Painter, 104
Pine as a Forest-maker. The Hickory, 55
Pipe-conduits and leaking Gas-mains, 33
Pipe-systems and Electrolysis, 48, 64
Pittsburgh Branch Library, 67
" Pa. Fall of Building in, 49
Plan for Improvement of New York City, 66
Political Aspects of the Anthracite-coal Strike, 81
Pollution of Chicago's Water-supply, 89
Port of London. The, 63
Prediction. An Unverified, 80
Prison. New York Hall of Records as a War, 19
Prison-ship Martyrs. Proposed Monument to, 24
Prix de Rome. This Year's, 74
Problems. London's Vast, 96
Production of Stone. American, 48
Profane Priests. Tower of St. Mark and, 64
Professional Obligations, 70
Professions Commercialized? Are the, 16
Propagation of Trees. State, 58
Protection against Combinations. The German Cartel System of, 10
Providence Public Library, 36
Prussian Bill-posting Regulations, 101
Public Money in Aid of Expositions. Protest against Use of, 25
Pyramids. Why they were built, 40

— Q —

Quincy Granite Quarries Co. Projected Reorganization of, 89

— R —

Railway to Chamonix. The Electric, 74
" Engineering. South American, 73
" Noise of the Boston Elevated, 10, 65
" Structures. Berlin Elevated, 24
Realty and Building Trust. The projected, 35
Rebuilding Tower of St. Mark:—
The Matter of, 73, 90
Raising Funds for, 65
Reclamation and Irrigation of Land, 2
Reference Libraries of the U. S., 21
Refrigerator. An Iceless, 80
Removal of the Hygeia Hotel at Fortress Monroe, 2
Reorganization of the Quincy Granite Quarries Co. and the American Bicycle Co. Projected, 89
Report of Tests made upon "Fireproof Wood," 75
Research Committee. The Lightning, 87
Resting-place of the Angevin Kings. The last, 101
Restoration of Clifford's Tower, 64
Resuscitation of Victim of Electric Shock. Rules to be observed in, 104
Richelieu, France, 53
Rights of Abutting Owner in Shade-trees on Highway, 57
" " Associations cannot exceed their Charters, 81
Roads. Coaching on Good, 32
Roman Galleys of Lake Nemi. The, 11
" Monument to Victor Emmanuel. The, 96
" and Romanesque France, 85
" Villas, 40
Rome. This Year's Prix de, 74
Roof. Cooling a, 40
Royal Palaces of London, 69
Ruins at Copan. The, 8
Runkle. Death of Prof. John D., 17
Ruskin's English, 104

— S —

Sacrilege at Stratford-on-Avon, 88
Safety-valves and Boiler Explosions, 73
St. James's Palace, London, 69
" John's Gate, Clerkenwell, London, 8
" Mark. Fall of Tower of, 17, 25, 41, 46, 47, 50, 61
" " The Matter of rebuilding Tower of, 73, 90
" Mark's Tower and Profane Priests, 64
" " " Raising Funds to Rebuild, 65
" Paul's Cathedral. The Stability of, 88
Salons. Notes on the late Paris, 38
SANITARY:—
Chicago's Water-supply. Pollution of, 89
Gas-leakage. Danger from, 32, 33
M. I. T. Sanitary Science at the, 1
Permeable Walls, 24
Sewage-treatment. Modern Methods of, 14
Sawdust. Utilization of, 8
School. The largest, 32
Schools. In Advocacy of Trade, 33
Scientific Books. Technical and, 13
Scotch Gardens, 95
Scotland and Ireland. The Proposed Tunnel between, 32
Sewage-treatment. Modern Methods of, 14
Sforza Castle, Milan. Da Vinci's Work at, 48
Shepherd, Redeemer of Washington. Death of Alexander R., 89
Sidewalk suggested for Brooklyn Bridge. Moving, 26
" Vault, N. Y. C. Suit over, 56, 57
Signs. Competition in Paris for Artistic Advertising, 50
" New York Municipal Art Society and Street, 66
Similarity between Standard Patterns and Geological Formations, 88
Skeleton found in the White House, 72
Small Libraries, 68
Smoke Consumption in Paris, 18
" Explosions in Burning Buildings, 48
South American Railway Engineering, 73
" Growth of the Lumber Trade in the, 56
Spanish Archæology, 79
Sphinx. The Decaying of the, 42
Stability of St. Paul's Cathedral. The, 88
State-house. The Interior Decoration of the Pennsylvania, 41
State Propagation of Trees, 58
Statesmen as Gargoyles. English, 72
Statue of Australia in Sydney Harbor. Proposed, 8
" " Indian. Dallin's, 22
Statues by Pierre de Franqueville, 72
Steel and Cast-iron in Building, 10
Steel-concrete Elevator. Concerning the Collapse of a, 16
Steel Construction. Notes on Iron and, 19, 91
" encased in Masonry. The Corrosion of, 17
Steps in the Philippines. First, 24
Stone-carvers. A Summer Class for, 41
Stone-production. American, 48
Storage Batteries, 16
Stratford-on-Avon. Sacrilege at, 88
Street-cleaning Department of New York effecting a Saving in the Disposal of Ashes, 26
Street Signs. New York Municipal Art Society and, 66
Strike against American Woollen Co., Fraudulent, 1
" of the Anthracite-coal Miners. The present, 58, 81, 97
" The Coal, 2
Strikes. German and Austrian Insurance against Loss through, 90
Studio. A New York, 14
Studios for Poor Paris Artists, 96
Study of Art in Italy, 56
Sturgis on the proper Functions of Universities in Art Instruction. Prof., 9
Substitute for Copper. Aluminium as a, 80
Substitutes for Anthracite Coal, 58, 64
Summer Class for Stone-carvers. A, 41

— T —

Tablet of Mena. The, 88
Tablets at the U. of P. Babylonian, 74
Tacoma Library, 61
Tariff on Lumber. Need for a Reduction of the, 81
Tariff-rulings on American Art. New, 1, 16
Technical and Scientific Books, 13
Technology. Instruction in Engineering at the Mass. Inst. of, 17
" Sanitary Science at the Mass. Inst. of, 1
Tenement-house Ordinance, Chicago. The proposed new, 6
Ternay. Proposed Monument at Newport, R. I., to Admiral de, 34
Tests of "Fireproofed Wood." Some Recent, 49, 75
" upon Malleable Glass, 104
Theatre, Chicago. The Iroquois, 100
Thief. Gas-fixtures and a New York, 66
Throne. The Oldest, 104
Tower. Restoration of Clifford's, 64
" of St. Mark. Fall of, 17, 25, 41, 46, 47, 50, 61
" " " " and Profane Priests, 64
" " " " Raising Funds to Rebuild, 65
" " " " The Matter of Rebuilding, 73, 90
Towers. Italian Bell, 3
Town Libraries, 35, 43, 60
Trade Schools. In Advocacy of, 33
Trade-unions in Germany, 16
" The Incorporation of, 41
Treatment of Sewage: Modern Methods, 14
Tree in Kansas. Biggest Cottonwood, 88
Tree-Planting Section of the U. S. Bureau of Forestry. Advice given by, 74
Tree. Perhaps the largest in the World, 55
Trees. State Propagation of, 58
"Tribune" and Marshall Field Buildings, Chicago, 7
Tripartite Stroke of Lightning, 96
Trust. Collapse of a German Cement, 72
" The projected Realty and Building, 34
Tunnel between New York and Brooklyn. The Contract for the, 34
" " Scotland and Ireland. The Proposed, 32
Tunnelling the Gemmi Pass, Switzerland, 90

— U —

Unconstitutionality of a New York Labor Law, 2
Unionism in Germany. Trade, 16
" and the Judiciary, 1
Union Men. Condition in 1902 of New York, 16
U. S. Bureau of Forestry giving Advice through its Division of Forest Extension, 74
" Iron Trade. A British Report on the, 78
" Libraries in the, 21, 27, 35, 43, 59, 67
" Well-borings. Deep, 32
University Libraries, 28
" of Penna. Babylonian Tablets at the, 74
Universities in the Matter of Art Instruction. Professor Sturgis on the proper Functions of, 9
Uralite, a new Fireproofing Material, 80
Utica Public Library, 59
Utilization of Lumber and Timber Waste-products, 8

— V —

Vault under Sidewalk, N. Y. C. Suit over, 56, 57
VENICE, ITALY:—
Tower of St. Mark. Fall of, 17, 25, 41, 46, 47, 50, 61
" " " " and Profane Priests, 64
" " " " Raising Funds to Rebuild, 65
" " " " The Matter of Rebuilding, 73, 90
Venice investigating Condition of her Public Buildings, 34
Vibert, Artist. Death of M., 50
Victor Emmanuel. The Roman Monument to, 96
Vienna. The Competitive Designs for the Franz Josef Museum at, 98
" " Growth of, 96
Vignola. The American, 51, 83
Villas. Roman, 40

— W —

Walls endangered by Water-soaked Flooring. Side, 57
" Permeable, 24
Wane of the Lightning-rod. The, 96
Warnings for Users of Electricity, 34, 48, 64
WASHINGTON, D. C.:—
Congressional Library, 21
Library. The Public, 37
U. S. Capitol. Enlargement of the, 98
White House Alterations. "Originality" in the, 24, 31
Washingtonian Home, Chicago. Condition of the, 6
Waste Products of Lumber and Timber. Utilization of, 8
Water-soaked Flooring. Side-walls endangered by, 57
Water-supply in Chicago. Pollution of, 89
Well-borings of the U. S. Deep, 32
Well Power. Artesian, 96
Westinghouse Building Operations in England. More Facts connected with the, 98
Westminster Presbyterian Church, Baltimore, Md., 16
When do Building Operations begin? 88, 95
Whistler as a West Pointer, 8
Whitehall, 69
White House Alterations. "Originality" in the, 24, 31
" " Enlargement of the, 98
" " Skeleton found in the, 72
Window-frames. Incombustible Lifting-sash, 7
Windows. Wire-glass, 99
Wire-glass Windows, 99
Wood. Fireproofed *vs.* Metal-covered, 26, 49, 89
"Wood." "Fireproof," So-called, 75
" Some recent Tests of "Fireproofed," 49, 75
Wooden Finish. Metal-covered, 103
Woodwork. Objections to Metal-covered, 49
Workingmen oppose additional Holidays. Some, 17
Work by the Chicago Art Inst. Students. Practical, 100
Works of American Artists residing Abroad entitled to Free Entry, 1, 15

ILLUSTRATIONS.

[*The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation. The abbreviation "Adv." denotes that the illustration was published on an advertising page, common to both the editions.*]

APARTMENT-HOUSES.

"The Empire," Boston, Mass. McKay & Dunham, Archts., 1394 (*Int.*): —
Entrance, 1394 (*Int.*)

"The Parkview," New York, N. Y. Elliott Lynch, Archt., 1393 (*Reg.*)

CLUB-HOUSES.

Saturday-Club Building, Wayne, Pa. D. K. Boyd, Archt., 1394 (*Int.*)

DETAILS.

Decoration in the Salle du Trône, Palais du Luxembourg, Paris, France. Painted by M. Henri Lehmann, 1389 (*Int.*)

Details of the Auditorium of the Majestic Theatre, Boston, Mass. J. M. Wood and J. G. Howard, Asso. Archts., 1386 (*Reg.*)

Doors and Gateways, Halle on the Saale, Saxony: 2 Plates, 1388 (*Int.*)

Doorway: Hôtel de Ville, Tours, France. Laloux, Archt.; — Entrance: Chamber of Commerce, Tours, France, 1389 (*Adv.*)

Entrance: "The Empire," Boston, Mass. McKay & Dunham, Archts., 1394 (*Int.*)
" to House of Edwin U. Curtis, Esq., Boston, Mass. Winslow & Bigelow, Archts., 1394 (*Int.*)
" " " " G. B. Harrah, New York, N. Y. Mantle Fielding, Architect, 1389 (*Int.*)
" " " " William Power Wilson, Esq., Boston, Mass., J. Ph. Rinn, Archt., 1393 (*Int.*)

Frescos in the Palazzo Labia, Venice, Italy. G. B. Tiepolo, Painter: —
"Banquet of Cleopatra," 1387 (*Int.*)
Details of Same, 1387 (*Int.*)
"Embarkation of Cleopatra," 1387 (*Int.*)
Details of Same, 1387 (*Int.*)

Gateway to Park and Main Gateway to City, Richelieu, France, 1390 (*Int.*)

Greek Orders, 1390 (*Reg.*)

Mantles, etc.: House of Hon. H. A. Taylor, Washington, D. C. Totten & Rogers, Archts., 1388 (*Int.*)

South Porch: Sta. Maria Maggiore, Bergamo, Italy. Drawn by W. Curtis Green, 1386 (*Adv.*)

U. S. Post-office and Court-house, San Francisco, Cal. J. K. Taylor, Supervising Archt.: —
Court-room Finish, 1385 (*Reg.*)
Library Finish: 2 Plates, 1385 (*Int.*)
Plans and Elevation, 1385 (*Reg.*)

University of Pennsylvania Dormitories, Philadelphia, Pa. Cope & Stewardson, Archts.: —
Arcade to Promenade, 1385 (*Reg.*)
" " Small Triangle, 1395 (*Int.*)
Details, 1395 (*Int.*)
Entrances. Some, 1395 (*Int.*)
Entry Doors, 1385 (*Reg.*)
Grotesques, 1385 (*Reg.*)
" 1395 (*Int.*)

DWELLINGS.

House at Bar Harbor, Me. A. W. Longfellow, Archt., 1388 (*Int.*)
" on Bay State Road, Boston, Mass.: —
Little & Brown, Archts., 1387 (*Int.*)
Shepley, Rutan & Coolidge, Archts., 1389 (*Reg.*)
" at Oxford, Eng. H. T. Hare, Archt., 1384 (*Adv.*)

(*Dwellings Continued.*)

House of Dr. A. Coolidge, Jr., Boston, Mass. R. C. Sturgis, Archt., 1395 (*Int.*)
" " W. A. Gaston, Esq., Boston, Mass. Peters & Rice, Archts., 1386 (*Int.*)
" " Dr. George Haven, Boston, Mass. R. C. Sturgis, Archt., 1391 (*Int.*)
" " Thomas Lockwood, Esq., Boston, Mass. Winslow & Bigelow, Archts., 1395 (*Int.*)
" " Mrs. Moen, Boston, Mass. Winslow & Bigelow, Archts., 1392 (*Int.*)
" " Hon. H. A. Taylor, Washington, D. C. Totten & Rogers, Archts., 1388 (*Int.*): —
Mantels, etc., 1388 (*Int.*)
" " William Power Wilson, Esq., Boston, Mass. J. Ph. Rinn, Archt., 1393 (*Reg.*): —
Entrance, 1393 (*Int.*)

"Moonhill," Cuckfield, Sussex, England. P. M. Horder, Archt., T. H. Mawson, Landscape Archt., 1385 (*Adv.*)

Villa of the Herren Kalmbach, Munich, Bavaria. E. Drollinger, Archt., 1395 (*Adv.*)

EDUCATIONAL.

Sweet Brier Institute, Virginia. Cram, Goodhue & Ferguson, Archts.: —
Bird's-eye View, 1391 (*Reg.*)
Chapel and Dormitories, 1391 (*Int.*)
Commencement Hall, 1392 (*Reg.*)
Great Court from Residential Quad, 1392 (*Reg.*)
Group Plan, 1391 (*Reg.*)
Gymnasium from Base Court, 1391 (*Int.*)
Library from Upper Terrace, 1392 (*Int.*)
Ramp. The, 1391 (*Int.*)
Science Hall and Industrial Building, 1392 (*Reg.*)
Terracing. A Bit of, 1391 (*Int.*)
Terrace. On the Upper, 1392 (*Int.*)

University of Pennsylvania Dormitories, Philadelphia, Pa. Cope & Stewardson, Archts.: —
Arcade to Promenade, 1385 (*Reg.*)
" " Small Triangle, 1395 (*Int.*)
Details, 1395 (*Int.*)
Entrances. Some, 1395 (*Int.*)
Entry Doors, 1385 (*Reg.*)
Grotesques, 1385 (*Reg.*)
" 1395 (*Int.*)
Main Entrance, 1384 (*Int.*)
Promenade, 1384 (*Reg.*)
" Terrace, 1384 (*Int.*)
Small Quad, 1386 (*Int.*)
Tower on Woodland Ave., 1385 (*Int.*)
View from Botanical Garden, 1385 (*Int.*)
Woodland Ave. Front, 1384 (*Reg.*)

ECCLESIASTICAL.

Cathedral, Monte S. Giuliano, Sicily; S. Satiro, Milan, Italy, 1384 (*Int.*)

Central Baptist Church, Wayne, Pa. D. K. Boyd & L. V. Boyd, Asso. Archts., 1394 (*Int.*): —
Elevations and Section, 1394 (*Reg.*)

Chapel and Dormitories: Sweet Brier Institute, Virginia. Cram, Goodhue & Ferguson, Archts., 1391 (*Int.*)

Churches at Röttingen and Thannhausen, Wurtemberg, Germany, 1386 (*Int.*)

Hereford Cathedral from the Southeast, 1389 (*Reg.*)

"La Ghirlandina," Modena, Italy; the Campanile, S. Gottardo, Milan, 1384 (*Int.*)

(*Ecclesiastical Continued.*)

New Church of St. Paul, Basel, Switzerland. Curjel & Moser, Archts., 1394 (*Int.*): —
Plans and Section, 1394 (*Int.*)
" Memorial Church, West Derby, Eng. J. O. Scott, Archt, 1391 (*Adv.*)

Roman Catholic Church, New York, N. Y. Elliott Lynch, Archt., 1394 (*Reg.*)

S. Apollinare in Classe, Ravenna, Italy; two Views, 1384 *Int.*)

St. Mary's Catholic Church, Dundee, Scotland. T. M. Cappom, Archt., 1393 (*Adv.*)

Sta. Maria in Cosmedin, Rome: Campanile of the Cathedral, Pistoja, Italy, 1384 (*Reg.*)

South Porch: Sta. Maria Maggiore, Bergamo, Italy. Drawn by W. Curtis Green, 1386 (*Adv.*)

"The Torrazzo," Cremona Cathedral, Italy, 1384 (*Int.*)

Tower of St. Mark, Venice, Italy; Campanile, La Badia, Florence, Italy, 1384 (*Reg.*)

FOUNTAINS.

"Fountain of Ceres." Pan-American Exposition, Buffalo, N. Y. E. F. Elwell, Sculptor, 1394 (*Adv.*)

HOTELS.

Arlington Hotel, Marlin, Texas. Herbert & Allen, Archts., 1389 (*Int.*)

Moana Hotel, Honolulu, H. I. O. G. Traphagen, Archt., 1390 (*Int.*)

Sketch for Proposed Hotel, Boston, Mass., 1396 (*Reg.*)

INTERIORS.

Interior View of Stable of Wm. A. Read, Esq., New York City. W. H. Beers, Archt., 1390 (*Int.*)

Library: House of Charles M. Gilman, Esq., Southport, Conn. W. H. Beers, Archt., 1396 (*Int.*): —
Library Fireplace, 1396 (*Int.*)

Studio of A. A. Anderson, Esq., Bryant Park Studios, New York, N. Y., 1385 (*Int.*)

LIBRARIES.

Competitive Design for the Carnegie Library, Burlington, Vt.: —
William Sanger, Archt., 1386 (*Reg.*)
Wales & Holt, Archts., 1396 (*Reg.*)

Competitive Design for the Boston Athenæum. 2 Plates: —
Stephen Codman, Archt., 1390 (*Reg.*)
H. D. Hale and G. B. de Gersdorff, Associate Archts., 1389 (*Reg.*)
Plans, Section and Elevation, 1389 (*Int.*)
A. W. Longfellow, Archt., 1395 (*Reg.*)
Parker & Thomas, Archts., 1388 (*Reg.*)
2 Plates. Rankin & Kellogg, Archts., 1395 (*Reg.*)
2 Plates. C. Howard Walker, Archt., 1388 (*Reg.*)

Library: Sweet Brier Institute, Virginia. Cram, Goodhue & Ferguson, Archts., 1392 (*Int.*)

MERCANTILE.

Board of Trade Building, Boston, Mass. Winslow & Bigelow, Archts., 1386 (*Reg.*) and (*Int.*)

Land Title Building, Philadelphia, Pa. D. H. Burnham & Co., Archts., 1396 (*Int.*): —
Elevation and Plan, 1396 (*Reg.*)

MISCELLANEOUS.

Château, City and Park of Richelieu, Richelieu, France, 1390 (*Reg.*): —
Gateway to Park and Main Gateway to City, 1390 (*Int.*)

Decoration in the Salle du Trône, Palais du Luxembourg, Paris, France. Painted by M. Henri Lehmann, 1389 (*Int.*)

(*Miscellaneous Continued.*)

Greek Orders, 1390 (*Reg.*)
"Loop the Loop" Architecture, 1387 (*Reg.*)
"Originality" and L'Art Nouveau, 1394 (*Int.*)
" of L'Art Nouveau: 2 Plates, 1390 (*Int.*)

Pan-American Exposition, Buffalo, N. Y.: —
Eectricity Building: Main Entrance. Green & Wicks, Archts., 1396 (*Adv.*)
Graphic Arts Building. Peabody & Stearns, Archts., 1394 (*Adv.*)
Machinery and Transportation Building: Main Entrance. Green & Wicks, Archts., 1396 (*Adv.*)
Pergolas and Colonnades. Carrère & Hastings, Archts., 1388 (*Adv.*)
The Stadium: Detail of Same. Babb, Cook & Willard, Archts., 1390 (*Adv.*)

Pedestals and Pilasters, 1394 (*Reg.*)

Pediments, 1394 (*Reg.*)

Studio of A. A. Anderson, Esq., Bryant Park Studios, New York, N. Y., 1385 (*Int.*)

Views in Antibes, France, 1394 (*Int.*)

MONUMENTAL.

Monument erected by the Salesian Fathers overlooking the Bay of Rio di Janeiro, Brazil, 1396 (*Int.*)

Tomb of Medea Colleoni, Bergamo, Italy. Drawn by Miss E. M. Green, 1387 (*Adv.*)

OFFICE-BUILDINGS.

"The Flat-iron," New York, N. Y. D. H Burnham & Co., Archts., 1396 (*Int.*): —
View from the Southeast, 1396 (*Int.*)

PUBLIC BUILDINGS.

City-hall, Concord, N. H. Accepted Design for the. Warren, Smith & Biscoe, Archts., 1387 (*Reg.*)
Side Elevation and Section, 1387 (*Reg.*)

New Scotland Yard Police-station, Westminster, Eng. J. D. Butler, Archt., 1392 (*Adv.*)

U. S. Court-house and Post-office, Elizabeth City, N. C.: —
J. K. Taylor, Supervising Archt., 1386 (*Reg.*)
Fergus Falls, Minn. J. K. Taylor, Archt., 1389 (*Reg.*)
San Francisco, Cal. J. K. Taylor, Supervising Archt.: —
Court-room Finish, 1385 (*Reg.*)
Library Finish: 2 Plates, 1385 (*Int.*)
Plans and Elevation, 1385 (*Reg.*)
Present Condition, 1385 (*Int*)

U. S. Custom-house and Post-office, Newport News, Va. J. K. Taylor, Supervising Archt., 1396 (*Reg.*)

U. S. Post-office, Anniston, Ala. J. K. Taylor, Supervising Archt., 1396 (*Reg.*)
" " Lockport, N. Y. J. K. Taylor, Supervising Archt., 1387 (*Reg.*)
" " Rome, N. Y. J. K. Taylor, Supervising Archt, 1393 (*Reg.*)

STABLES.

Stable of Wm. A. Read, Esq., New York City. W. H. Beers, Archt., 1390 (*Int.*): —
Interior View of Same, 1390 (*Int.*)

THEATRES.

Majestic Theatre, Boston, Mass. Details of the Auditorium. J. M. Wood and J. G. Howard, Associate Archts., 1386 (*Reg.*)

TEXT CUTS.

[The figures refer to the page of text, not to the number of the journal.]

American Vignola Diagrams, 51, 52, 53, 83, 84

Campanile of the Cathedral, Pescia, 4

" Church of the Martorana, Palermo, 6

" Florence, 5

" Pisa, 4

Carnegie Library: —

Atlanta, Ga. First-floor Plan, 43

Davenport, Ia. First-floor Plan, 43

East Orange, N. J., 60

Carnegie Library: —

Pittsburgh, Pa. Lawrenceville Branch. First Floor, 67

" " Mount Washington Branch. First Floor, 67

Lower Part of Cathedral, Girgenti, 5

New York Public Library Plan, 27

" " University Library. Main-floor Plan, 29

Ornamental Metalwork, 85

Public Library, Fall River, Mass., 60

" " Milwaukee. First-floor Plan, 35

" " Nashua, N. H., 61

" " Newark, N. J. Main-floor Plan, 36

" " Pawtucket, R. I. First floor Plan, 59

" " Providence, R. I. First-floor Plan, 37

" " Tacoma, Wash. Second-floor Plan, 61

Public Library, Utica, N. Y., 59

" " Washington, D. C. First-floor Plan, 38

" " Wayland, Mass. First-floor Plan, 68

Residence of Hon. H. A. Taylor, Washington, D. C. First-floor Plan, 39

Richelieu, France. One of the small Gateways, 54

Russell Library, Plymouth, Mass., 68

SS. Giovanni e Paolo, Ravenna, Italy, 3

State Historical Society Library, Madison, Wis. Second-floor Plan, 28

INDEX BY LOCATION.

[The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation.]

— A —

Anniston, Ala. U. S. Post-office. J. K. Taylor, Supervising Archt., 1396 (*Reg.*)

Antibes, France. Views in, 1394 (*Int.*)

— B —

Bar Harbor, Me. House. A. W. Longfellow, Archt., 1388 (*Int.*)

Basel, Switzerland. New Church of St. Paul. Curjel & Moser, Archts., 1394 (*Int.*): —

Plans and Section, 1394 (*Int.*)

Bergamo, Italy. Sta. Maria Maggiore: South Porch. Drawn by W. Curtis Green, 1386 (*Adv.*)

" " Tomb of Medea Colleoni. Drawn by Miss E. M. Green. 1387 (*Adv.*)

BOSTON, MASS.: —

Athenæum. Competitive Design for the Boston: —

Stephen Codman, Archt., 1390 (*Reg.*) 2 Plates.

H. D. Hale and G. B. de Gersdorff, Associate Archts., 1389 (*Reg.*): —

Plans, Section and Elevation, 1389 (*Int.*)

A. W. Longfellow, Archt., 1395 (*Reg.*)

Parker & Thomas, Archts., 1388 (*Reg.*)

Rankin & Kellogg, Archts., 1395 (*Reg.*) 2 Plates.

C. Howard Walker, Archt., 1388 (*Reg.*) 2 Plates.

Board of Trade Building. Winslow & Bigelow, Archts., 1386 (*Reg.*) and (*Int.*)

"The Empire." McKay & Dunham, Archts., 1394 (*Int.*): —

Entrance, 1394 (*Int.*)

Entrance to House of Edwin U. Curtis, Esq. Winslow & Bigelow, Archts., 1394 (*Int.*)

House of Dr. A. Coolidge, Jr. R. C. Sturgis, Archt., 1395 (*Int.*)

" " W. A. Gaston, Esq. Peters & Rice, Archts., 1386 (*Int.*)

" " Dr. George Haven. R. C. Sturgis, Archt., 1391 (*Int.*)

" " Thomas Lockwood, Esq. Winslow & Bigelow, Archts., 1395 (*Int.*)

" " Mrs. Moen. Winslow & Bigelow, Archts., 1392 (*Int.*)

BOSTON, MASS.: —

House of William Power Wilson, Esq. J. Ph. Rinn, Archt., 1393 (*Reg.*)

Entrance, 1393 (*Int.*)

" on Bay State Road. Little & Browne, Archts., 1387 (*Int.*)

" on Bay State Road. Shepley, Rutan & Coolidge, Archts., 1389 (*Reg.*)

Majestic Theatre: Details of the Auditorium. J. M. Wood and J. G. Howard, Associate Archts., 1386 (*Reg.*)

Sketch for Proposed Hotel, 1396 (*Reg.*

BUFFALO, N. Y.: —

Pan-American Exposition: —

Electricity Building: Main Entrance. Green & Wicks, Archts., 1396 (*Adv.*)

"Fountain of Ceres." E. F. Elwell, Sculptor, 1394 (*Adv.*)

Graphic Arts Building. Peabody & Stearns, Archts., 1394 (*Adv.*)

Machinery and Transportation Building: Main Entrance. Green & Wicks, Archts., 1396 (*Adv.*)

Pergolas and Colonnades. Carrère & Hastings, Archts., 1388 (*Adv.*)

The Stadium: Detail of Same. Babb, Cook & Willard, Archts., 1390 (*Adv.*)

Burlington, Vt. Competitive Design for Carnegie Library: —

William Sanger, Archt., 1386 (*Reg.*)

Wales & Holt, Archts., 1396 (*Reg.*)

— C —

Concord, N. H. Accepted Design for the City-hall. Warren, Smith & Biscoe, Archts., 1387 (*Reg.*): —

Side Elevation and Section, 1387 (*Reg.*)

Cremona, Italy. "The Torrazzo," Cremona Cathedral, 1384 (*Int.*)

Cuckfield, Sussex, Eng. "Moonhill." P. M. Horder, Archt. T. H. Mawson, Landscape Archt., 1385 (*Adv.*)

— D —

Dundee, Scotland. St. Mary's Catholic Church. T. M. Cappom, Archt., 1393 (*Adv.*)

— E —

Elizabeth City, N. C. U. S. Court-house and Post-office. J. K. Taylor, Supervising Archt., 1386 (*Reg.*)

— F —

Fergus Falls, Minn. U. S. Court-house and Post-office. J. K. Taylor, Supervising Archt., 1389 (*Reg.*)

Florence, Italy. Campanile, La Badia, 1384 (*Reg.*)

— H —

Hereford Cathedral from the Southeast, 1389 (*Reg.*)

Honolulu, H. I. Moana Hotel. O. G. Traphagen, Archt., 1390 (*Int.*)

— L —

Lockport, N. Y. U. S. Post-office. J. K. Taylor, Supervising Archt., 1387 (*Reg.*)

— M —

Marlin, Tex. Arlington Hotel. Herbert & Allen, Archts., 1389 (*Int.*)

Milan, Italy. Campanile S. Gottardo, 1384 (*Int.*)

" " S. Satiro, 1384 (*Int.*)

Modena, Italy. "La Ghirlandina," 1384 (*Int.*)

Munich, Bavaria. Villa of the Herren Kalmbach. E. Drollinger, Archt., 1395 (*Adv.*)

— N —

Newport News, Va. U. S. Custom-house and Post-office. J. K. Taylor, Supervising Archt., 1396 (*Reg.*)

NEW YORK, N. Y.: —

Entrance to House of G. B. Harrah. Mantle Fielding, Archt., 1389 (*Int.*)

"The Flat-iron." D. H. Burnham & Co., Archts., 1396 (*Int.*): —

View from the Southeast, 1396 (*Int.*)

"The Parkview." Elliott Lynch, Archt., 1393 (*Reg.*)

Roman Catholic Church. Elliott Lynch, Archt., 1394 (*Reg.*)

Stable of Wm. A. Read, Esq. W. H. Beers, Archt., 1390 (*Int.*): —

Interior View of Same, 1390 (*Int.*)

Studio of A. A. Anderson, Esq., Bryant Park Studios, 1385 (*Int.*)

— O —

Oxford, Eng. House. H. T. Hare, Archt., 1384 (*Adv.*)

— P —

PARIS, FRANCE: —

Decoration in the Salle du Trône, Palais du Luxembourg. Painted by M. Henri Lehmann, 1389 (*Int.*)

PHILADELPHIA, PA.: —

Land Title Building. D. H. Burnham & Co., Archts., 1396 (*Int.*): —

Elevation and Plan, 1396 (*Reg.*)

University of Pennsylvania Dormitories. Cope & Stewardson, Architects: —

Arcade to Promenade, 1385 (*Reg.*)

" " Small Triangle, 1395 (*Int.*)

PHILADELPHIA, PA.: —

University of Pennsylvania Dormitories. Cope & Stewardson, Architects: —

Details, 1395 (*Int.*)

Entrances. Some, 1395 (*Int.*)

Entry Doors, 1385 (*Reg.*)

Grotesques, 1385 (*Reg.*)

" 1395 (*Int.*)

Main Entrance, 1384 (*Int.*)

Promenade, 1384 (*Reg.*)

" Terrace, 1384 (*Int.*)

Small Quad, 1386 (*Int.*)

Tower on Woodland Ave., 1385 (*Int.*)

View from Botanical Garden, 1385 (*Int.*)

Woodland Ave. Front, 1384 (*Reg.*)

Pistoja, Italy. Campanile of the Cathedral, 1384 (*Reg.*)

— R —

Ravenna, Italy. S. Apollinare in Classe: Two Views, 1384 (*Int.*)

Richelieu, France. Château, City and Park of Richelieu, 1390 (*Reg.*): —

Gateway to Park and Main Gateway to City, 1390 (*Int.*)

Rio di Janeiro, Brazil. Monument erected by the Salesian Fathers overlooking the Bay, 1396 (*Int.*)

Rome, Italy. Sta. Maria in Cosmedin, 1384 (*Reg.*)

" N. Y. U. S. Post-office. J. K. Taylor, Supervising Archt., 1393 (*Reg.*)

Röttingen, Wurtemberg, Ger. Church at, 1386 (*Int.*)

— S —

San Francisco, Cal. U. S. Post office and Court-house. J. K. Taylor, Supervising Archt.: —

Court-room Finish, 1385 (*Reg.*)

Library Finish: 2 Plates, 1385 (*Int.*)

Plans and Elevation, 1385 (*Reg.*)

Present Condition, 1385 (*Int.*)

Saxony. Doors and Gateways, Halle on the Saale: 2 Plates, 1388 (*Int.*)

Sicily. Cathedral, Monte S. Giuliano, 1384 (*Int.*)

Southport, Conn. Library: House of Charles M. Gilman, Esq. W. H. Beers, Archt., 1396 (*Int.*): —

Library Fireplace, 1396 (*Int.*)

— T —

Thannhausen, Würtemburg, Ger. Church at, 1386 (*Int.*)

Tours, France. Doorway: Hôtel de Ville; — Entrance: Chamber of Commerce. Laloux, Archt., 1389 (*Adv.*)

— V —

Venice, Italy: —

Frescos in the Palazzo Labia. G. B. Tiepolo, Painter: —

"Banquet of Cleopatra," 1387 (*Int.*)

Details of Same, 1387 (*Int.*)

"Embarkation of Cleopatra," 1387 (*Int.*)

Details of Same, 1387 (*Int.*)

Tower of St. Mark, 1384 (*Reg.*)

Virginia. Sweetbrier Institute. Cram, Goodhue & Ferguson, Archts.: —

Bird's-eye View, 1391 (*Reg.*)

Chapel and Dormitories, 1391 (*Int.*)

Commencement Hall, 1392 (*Reg.*)

Great Court from Residential Quad, 1392 (*Reg.*)

Group Plan, 1391 (*Reg.*)

Gymnasium from Base Court, 1391 (*Int.*)

Library from Upper Terrace, 1392 (*Int.*)

Virginia. Sweetbrier Institute. Cram, Goodhue & Ferguson, Archts.: —

Ramp. The, 1391 (*Int.*)

Science Hall and Industrial Building, 1392 (*Reg.*)

Terracing. A Bit of, 1391 (*Int.*)

Terrace. On the Upper, 1392 (*Int.*)

— W —

Washington, D. C. House of Hon. H. A. Taylor. Totten & Rogers, Archts., 1388 (*Int.*): —

Mantels, etc., 1388 (*Int.*)

Wayne, Pa. Central Baptist Church. D. K. Boyd and L. V. Boyd, Associate Architects, 1394 (*Int.*): —

Elevations and Section, 1394 (*Reg.*)

" " Saturday-Club Building. D. K. Boyd, Archt., 1394 (*Int.*)

West Derby, Eng. New Memorial Church. J. O. Scott, Archt., 1391 (*Adv.*)

Westminster, Eng. New Scotland Yard Police-station. J. D. Butler, Archt., 1392 (*Adv.*)

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL LXXVIII

OCTOBER - DECEMBER

* 1902 *

BOSTON
AMERICAN ARCHITECT AND BUILDING NEWS CO.
211 TREMONT STREET

HELIOTYPE

L.S. IPSEN - DEL.

S. J. Parkhill & Co., Printers
Boston, U. S. A.

INDEX TO VOLUME LXXVIII.

OCTOBER — DECEMBER, 1902.

ACCIDENTS: —
Balloon Accidents in Paris. Two recent, 66
Acoustic Changes at the Prince Regent's Theatre, Munich, 8
Address of the President of the American Institute of Architects. Annual, 91
Advantages or Disadvantages of the Carnegie Gift Library, 34
Aërial Navigation. Part of Aluminium Bronze in, 66
Air and Light in Cities, 7
Aluminium Bronze in Aërial Navigation, 66
American Bridges, 24
" Buildings. Possibilities of Longevity in, 10
American Gardens. Edited by Guy Lowell, 95
American Indifference to Art, 41
A. I. A. Annual Address of the President of the, 91
" Programme of the Thirty-sixth Annual Convention, 78
" Thirty-sixth Annual Convention of the, 92, 99
American International Archæological Commission. The, 72
" Iron Trade: Why it gains over the British, 17
" Purchasers of reputed "Old Masters." Frauds perpetrated on, 73
" Vignola. The, 27

ANECDOTES:
Ball-room in the Melbourne Government House, 13
Bridge of San Martin, in Spain, 56
Draughtsman a Hero in an Explosion, 88
Jokes in Bricks and Brass, 104
Anglo-Germanic Attack on Venezuela. The, 90
Anthracite-beds of Massachusetts and Rhode Island, 1, 17
Anthracite Coal, 88
" " Strike. The, 1, 9, 17, 25, 37, 65
" " Mining partially resumed in New England, 89
Apulia. Scheme for the Irrigation of, 18
Arbitration of Labor-disputes in New Zealand, 32

ARCHÆOLOGICAL: —
Aztec Find in Mexico, 64
Bœotia. Valuable Find in, 40
Bronze Household Gods of the Jews, 72
Cuneiform Tablets from Nippur. The, 16
Ephesian Finds, 72
Heræum. The Argive, 102
Japanese Investigation of Buddhist Remains, 8
Parthenon Frieze Fragment found in an English Garden, 98
Pueblo Indian Life in Argentina, S. A. Traces of, 57

ARCHÆOLOGICAL: —
Tiber's Treasures. A Search for the, 71
Tombs discovered in the Roman Forum, 16
Zimbabwe Ruins, 30
Archæological Commission. The American International, 72
" Value of old Cottages, 24
Arch. Method of drawing an Elliptical, 58
Arches. Theory of Steel-concrete. By William Cain, 7
Architects blackmailed by Trade-unions, 65
" Diplomaed and Non-diplomaed, 77
Architect's Responsibility and the Dry-rot Fungus, 77
Architects. Triennial Prize for Prussian, 58
Architectural Course at Washington University, St. Louis, 57
" School of Columbia University. Twenty-first Anniversary of the, 50
Architecture of Bath. The Eighteenth-century. By Mowbray A. Green, 21
Architecture. A Means of stimulating Improvement in Urban, 49
Argive Heræum. The, 102
Aries, 70
Armor to protect from High-tension Electricity, 2
Armored-concrete Construction. The Hennebique System of, 67, 75
Armored, or Ferro-concrete. Strength of, 38
Art. American Indifference to, 41
" Bill for placing on Free List certain Works of, 90
" Commission and the Street-signs. The New York, 16
" School. The German Industrial, 48
" Venetian Works of, 16
Arts and Crafts School for Paris, 6
Artificial Beauty in Landscape. The Relation of Natural to, 84
" Island to be built in New York Harbor, 80
Artistic Development. Influence of Photographic Processes on, 41
Ashes of Columbus now in Seville Cathedral, 80
Assouan Dam. The, 18
Attack on Venezuela. The Anglo-Germanic, 90
Australian Soft Woods, 22
Australia's Trade-union Comedy, 2
Aztec Find in Mexico, 64

— B —

Balloon Accidents in Paris. Two recent, 66
" Navigation. Part of Aluminium Bronze in, 66
" in Offensive Warfare. Possibility of Actual Use of the, 90
Ball-room in the Melbourne Government House, 13
Balzac Statue. The, 64
Bamboo, 104
Bath. The Eighteenth-century Architecture of. By Mowbray A. Green, 21
Beautiful in Painting. What constitutes the, 73
Beauty in Landscape. Relation of Natural and Artificial, 84
Bemis, Architect. Death of John W., 90
Berlin Sewerage System. The, 9
Bill for the placing of Works of Art on the Free List, 90
Billets of Steel. An iniquitous Enhancement of Duties on Imported, 33
Bird's-eye Maple, 40
Blackmailer? Is the Architect a, 6
Blackmailing of Architects by Trade-unions, 65
Bœotia. Valuable Find in, 40
Borghese Villa bought by Italian Government, 34

BOSTON: —
M. I. T. to establish a Graduate School of Engineering, 90
Museum of Fine-Arts. Cast of the Colleoni for, 64
Park Street Church to be removed, 89
Brick Foundations, 80
Bridge. R. I. B. A. and the Vauxhall, 74
" Vibration and the Seismograph, 64
Bridges. American, 24
" Artistic and Inartistic, 74
Briquettes. German Coal, 8
British Iron Trade. Gain of American over the, 17
Bronze Doors in Italy, 83
" Household Gods of the Jews, 72
Bruand and Hardouin-Mansart. Statues of, 8
Buddhist Remains. Japanese Investigation of, 8
Building Contract. An old, 15
Building-laws for Paris. New, 80
Building-regulations in their Application to Residential Districts, 34
Building-trades. Labor-issues in the, 59
Building for the District of Columbia. The Competition for the, 94
" demolished in New York. A riveted Steel-frame, 90
Buildings. Possibilities of Longevity in American, 10
" in Washington. New Commercial, 94
Bulgaria. Memorial Church at Shipka Pass, 58
Burial-place of Charlemagne, 64
Burning of the Château d'Eu, 64

— C —

Campagna. Malaria in the Roman, 17
Capitol. Changes in the U. S., 32
" Restorations at the, 94
" Suggested Changes in the U. S., 49
Carnegie Gift Library. Advantages or Disadvantages of the, 34
"Carpet." "On the," 24
Cast of the Colleoni for Boston Museum of Fine-Arts, 64
Casts. Coloring Museum, 87
Cathedral Competition. The Liverpool, 18
" of Gothenburg, 16
" London. The Roman Catholic, 23
" West Front of Peterborough, 72
Cedar. An old Brown, 24
Cedar-forest whittled down. A, 24
Cellar of Bremen Cathedral. Mummifying Properties of the, 48
Cement. How coated for painting, 96
Changes in the White House, 32
" " " " " Suggested, 49
Charlemagne's Burial-place, 64
Château d'Eu. Burning of the, 64
" de Grignan. The, 42

CHICAGO: —
Drainage-canal Case, 57
Grocery Employés' Union voluntarily seeks Incorporation. Wholesale, 2
Tunnel for Freight-traffic, 50
Chimney. Taking down a Steel, 72
China and Chinese Homes. Glimpses of. By Edward S. Morse, 39
Church at Shipka Pass, Bulgaria. A Memorial, 58
" Site, Boston. Sale of Park Street, 89
City Architecture. A Means of Stimulating Improvement in, 49
City-hall. The Philadelphia, 55
Clay. A curious Property of, 98
Cleaning Exterior of Treasury Building, Washington, by Sand-blast, 94
Cliff-dwellers. New Facts about, 40
Coal. Advisability of Temporary Suspension of the Tariff on Imported, 90
" Anthracite, 88
" Briquettes in Germany, 8
" Mines of Mass. and R. I., 1, 17
Coal-mining of Anthracite partially resumed in New England, 89
Coal Region. A Voice from the, 7
" Strike. The, 1, 9, 17, 25, 37, 65
Coating Cement for Painting, 96
"Collective" Ticket on a French Railway. The, 10
Colleoni Cast for Boston Museum of Fine-Arts, 64
Coloring Museum Casts, 87
Columbia University Architectural School celebrates Twenty-first Anniversary, 50
Columbus now in Seville Cathedral. Ashes of, 80
Columns. Size-limit for Lathe-turned Monolithic, 10
Commission. The American International Archæological, 72
Competition for the District of Columbia Building. The, 94
" The Liverpool Cathedral, 18
Concrete Construction. The Hennebique System of Armored, 67, 75
" Ferro, 38
Concrete-imbedded Steel. Experiments on, 24
Concrete of Portland-cement and Seawater, 40

Concrete. Strength of Ferro, or Armored, 38
Concretes. Relative Compressive Strength of Gravel and Broken-stone, 35
Construction. The Hennebique System of Armored-concrete, 67, 75
" Notes on Iron and Steel, 43, 51
" Relative Permanence of Steel and Masonry, 11
Contract. An old Building, 15
Contributions for the Rebuilding of St. Mark's Tower, 10
Convention of the A. I. A. Thirty-sixth Annual, 92, 99
Cope, Architect. Death of Walter, 41
" The late Walter, 56
Corrosion of Steel Frames of Buildings, 36
" " Steel-frame Construction. Investigation into the, 25
Cost of Land near Wall Street, New York, 97
Costliness of Single-family Dwelling-houses in New York, 97
Cottages. The Archæological Value of old, 24
Court-house Uptown suggested for New York. A new, 74
Cuneiform Tablets from Nippur, 16
Custom-house Officers. Humors of, 80

— D —

Dam at Assouan. The Nile, 18
Defacement of a Church-façade by Italian Street-boys, 72
Demolition of a riveted Steel-frame Building in New York, 90
Depth of Glaciers. The, 32
Diplomaed and Non-diplomaed Architects, 77
District of Columbia Building. The Competition for the, 94
Doors in Italy. Bronze, 83
Drainage-canal Case. The Chicago, 57
Draughtsman a Hero in an Explosion, 88
Drawings of Old Oak English Furniture. By John W. Hurrell, 39
Drawings. Ownership of, 96
Driving large Rivets, 93
Dry-rot Fungus. Architect's Responsibility and the, 77
Duty of the Engineer. The, 46, 53
" on imported Coal. Advisability of Temporary Suspension of the, 90
" " Window-glass. Attempt to remove, 97
" " certain Classes of Works of Art. Bill for removing, 90
Duties on imported Steel Billets. An iniquitous Enhancement of, 33
Dwelling-houses in New York. Costliness of Single-family, 97

— E —

Earthquake. Relics of the Lisbon, 32
Economies of the so-called Steel Trust, 79
Eden on Roof-coverings. F. C., 82
Eighteenth-century Architecture of Bath. The. By Mowbray A. Green, 21
Electrical Engineering Practice. The Ethics of, 48
Electric Fire-pump in Rouen, 103
Electric-railway Regulations in Germany, 63
Electricity. A Protection against High-tension, 2
" for thawing Water-pipes, 80
Elliptical Arch. Method of drawing an, 58
Elsinore to have Statue of Shakespeare, 8
Engineer. The Duty of the, 46, 53

ENGINEERING :—
Assouan Dam. The, 18
Construction. Relative Permanence of Steel and Masonry, 11, 19
Ethics of Electrical Engineering Practice, 48
Hennebique System of Armored-concrete Construction. The, 67, 75
Irrigation Scheme for Apulia, 18
M. I. T. to establish a Graduate School of Engineering, 90
New York Subway. Difficult Engineering in, 7
Notes on Iron and Steel Construction, 43, 51
Pennsylvania Railroad Tunnel and the Freezing Process, 98
Raising the Level of the Great Lakes, 40
Seismograph and Bridge Vibration. The, 64
Steel-frame Construction. Investigation into Corrosion of, 25
Tunnel for Freight Traffic in Chicago, 50
Water-power of the Lake of Tanay, Switzerland. Utilizing the, 58

England. Municipal Ownership in, 98
English. Italianized, 88
Ephesian Finds. The, 72
Ethics of Electrical Engineering Practice, 48
Exhibition of Paris Shop-signs, 8
" Success of the Turin, 72
Expelled Union Men reinstated by the Court, 81
Experimental Reforestation in Minnesota, 42
Experiment Station investigates the Corrosion of Steel-frame Construction. Insurance Engineering, 25
Experiments with Ferro-concrete, 38
" on Steel in Concrete, 24
Extinguisher. A new Fire, 63
Eyesight in Winter. The Shortening of, 56

— F —

Fabric Fund of Westminster Abbey. The, 29
Façades. Cases of Inclined, 42
Falguière. The Musée, 48
"Family Ticket" on a French Railway. The, 10
Famous Walnut Log. A, 32
Fan System for heating Shops, 88
Ferguson, Architect. Death of G. H., 90
Ferro, or Armored, Concrete. Strength of, 38
Fifth Ave., New York, invaded by a Speculative Building, 34
Figure-painting, 73
Fire-extinguisher. A new, 63
Fire-pump in Rouen. Electric, 103
Fire for Quarrying Granite, 96
" by Spontaneous Combustion of Soot, 16
Fireproof Village. A Russian, 64
Fireproofed Wood and Parlor Matches, 74
Flues in a Party-wall. Right to use, 72
Forestry. Minnesota Law in the Interests of, 42
Foundations. Brick, 80
Fountain in the New York Zoölogical Park. An Italian, 50
" " Vienna. The Reichsrath, 88
Fragment of Parthenon Frieze found in an English Garden, 98
France. Roman and Romanesque, 13, 70
Frauds perpetrated on American Purchasers of reputed "Old Masters," 73
Freezing Process and the Pennsylvania Railroad Tunnel, 98
Fréjus, 13
Frescos on the Pinakothek. Restoring the, 16
Front of San Ambrogio, Genoa. The inclined, 42
Furniture. The Manufacture of Spurious, 58
Furniture. Measured Drawings of Old Oak English. By John W. Hurrell, 39

— G —

Gardens. American. Edited by Guy Lowell, 95
Gas as Heat, Light and Power, 56
Gas-mains. Infection of Cellars by Leakage from, 57
Geneva School of Industrial Art. The, 48
Georgian Period. The, 1
German Coal Briquettes, 8
" Electric-railway Regulations, 63
" Pumice-stone Bricks, 32
Gifts to the Irish National Gallery, 8
Glaciers. The Depth of, 32
Glass-blowers' Union and the Window-glass Trust. The, 97
Glimpses of China and Chinese Homes. By Edward S. Morse, 39
Gods of the Jews. Discovery of Bronze Household, 72
Gothenburg. The Cathedral of, 16
Graduate School of Engineering. M. I. T. to establish, 90
Great Lakes. Raising Level of the, 40
Grignan. The Château de, 42
Grocery Employés Union voluntarily seeks Incorporation. Wholesale, 2

— H —

Hall of Records, New York, to be demolished. Old, 17
Hardouin-Mansart and Bruand. Statues of, 8
Heating Shops by the Fan System, 88
Heating and Ventilating Systems. By R. C. Carpenter, 103
" " *Ventilation. Steam.* By W. S. Monroe, 6
Hennebique System of Armored-concrete Construction. The, 67, 75
Heræum. The Argive, 102
Highest Waterfall in the World, 104
Hobrecht, Engineer. Death of James, 9
Houses carried Seventy Miles on Flat-boat, 16
Hudson River Tunnel. Freezing Process and the, 98
Humors of the Custom-house Officers, 80
Huts. Russian, 64

— I —

Improvement of Washington, 101
Incandescent Lamps, 88
Inclined Façades. Cases of, 42
Incorporation of Labor-unions. Massachusetts and the, 33
" " Trade-unions, 81
Indian Life in Argentina, S. A. Traces of Pueblo, 57
Indifference to Art. American, 41
Industrial Art. The Geneva School of, 48
Infection of Basement Stories by Leakage from Street Gas-mains, 57
Influence of Photographic Processes on Artistic Development, 41
Inst. of Tech. to establish a Graduate School of Engineering, 90
Insurance-engineering Experiment-station investigates Corrosion of Steel-frame Construction, 25
Irish National Gallery. Gifts to the, 8
Iron and Steel Construction. Notes on, 43, 51
" " " Slag, 31
" Trade. Why the American gains over the British, 17
Irrigation Scheme for Apulia, 18
Island to be built in New York Harbor. Artificial, 80
Italian Government buys the Villa Borghese, 34
" Street-boys and Architecture, 72
" Town-halls of the Middle Ages, 3
Italianized English, 88
Italy. Bronze Doors in, 83
Italy's Telepherage Mails, 56
Izbas. Russian, 64

— J —

Jewish Gods of Bronze. Discovery of, 72
Jokes in Bricks and Brass, 104

— L —

Labor-disputes in New Zealand. Arbitration of, 32
" Issues in the Building-trades, 59
" Trusts the Worst, 37
" Union Tyranny. Publicity in a Measure a Correction of, 65
" Unions. Massachusetts and the Incorporation of, 33
Lake of Tanay, Switzerland. Utilizing the Water-power of the, 58
Lakes. Raising Level of the Great, 40
Lamps. Incandescent, 88
Land near Wall Street, New York. Cost of, 97
Landscape-painting, 74
Landscape. The Relation of Natural to Artificial Beauty in, 84
Lazarus Scholarship for Mural Painting. Award of the, 82
Leaning Façade of San Ambrogio, Genoa, 42

LEGAL :—
Drainage-canal Case. The Chicago, 57
Light and Air Case in New York. A, 97
Right to use Flues in a Party-wall, 72
" " Light and Air, 72

Letter from Paris, 77
" " Washington, 94
Level of the Great Lakes. Raising the, 40
Library. Advantages or Disadvantages of the Gift, 34
Light and Air Case in New York. A, 97
" " " in Cities, 7
" " " Right, 72
Lion of Lucerne. The, 23
Lisbon Earthquake Relics, 32
Liverpool Cathedral Competition. The, 18

LONDON :—
Fabric Fund of Westminster Abbey. The, 29
Roman Catholic Cathedral, Westminster, 23
Vauxhall Bridge. R. I. B. A. and the, 74
Westminster Abbey. Memorial Window, 15

London, Mediæval. By William Benham, 38
Longevity in American Buildings. Possibilities of, 10
Lucerne. The Lion of, 23
Luini's Portraits of the Sforzas, 64
Lumbermen of New England. Weather favorable for, 89

— M —

McGee and the American International Archæological Commission, 72
Macedonian Soldiers. Discovery of Remains of, 40
Mails in Italy. Telepherage, 56
Malaria in the Roman Campagna. The, 17
Manuscript of Ruskin's *Seven Lamps of Architecture.* The, 80
Maple. Bird's-eye, 40
Martinmas, 56
Masonry and Steel Construction. Relative Permanence of, 11, 19
" Structural Steel surrounded by, 26
Massachusetts Coal-mines, 1, 17
" and the Incorporation of Labor-unions, 33
M. I. T. to establish a Graduate School of Engineering, 90
Measured Drawings of Old Oak English Furniture. By John W. Hurrell, 39
Mediæval London. By William Benham, 38
Melbourne Government House Ball-room. The, 13
Memorial Church at Shipka Pass, Bulgaria, 58
" Window in Westminster, 15
Metropolitan Museum of Fine-Arts. The new President of the, 42
Mexico. Aztec Find in, 64
Militiaman expelled from Trade-union, 81
Minnesota. Experimental Reforestation in, 42
Mission Buildings of Texas. Movement to preserve, 16
Mummifying Properties of a Church Vault. The, 48
Munckwitz, Architect. Death of Julius, 66
Munich. Acoustic Changes in the Prince Regent's Theatre, 8
Municipal Ownership in England, 98
Mural Painting. Award of the Lazarus Scholarship for, 82
Musée Falguière, Paris. The, 48
Museum of Fine-Arts, Boston, to have Cast of the Colleoni, 64
" " " The new President of the Metropolitan, 42

— N —

National Gallery, Dublin. Gifts to the, 8
Natural to Artificial Beauty in Landscape. The Relation of, 84
Navigation of the Air. Part of Aluminium Bronze in, 66
"New Palace," Potsdam. The "Graces" on the, 16

NEW YORK :—
Art Commission and the Street-signs, 16
Chimney. Taking down a Steel, 72
Court-house Uptown suggested. A new, 74
Demolition of a riveted Steel-frame Building, 90
Dwelling-houses. Costliness of Single-family, 97
Fifth Avenue invaded by a Speculative Building, 34
Fireproofed Wood and Parlor Matches, 74
Fountain for the Zoölogical Park. An Italian, 50
Hall of Records to be demolished. Old, 17
Harbor to have Artificial Island, 80
Land near Wall Street. Cost of, 97
Light and Air Case. A, 97
Metropolitan Museum of Fine-Art. The new President of the, 42
Pabst Hotel. Demolition of the, 90
School-house of Eight Stories projected, 89
Stock Exchange, 39
Subway. Difficult Engineering in the, 7

New Zealand Labor-disputes. Arbitration of, 32
Nile Dam at Assouan. The, 18
Nippur. The Cuneiform Tablets from, 16
Notes on Iron and Steel Construction, 43, 51
Nuremberg Rathhaus. Restoring the Hall in the, 48

— O —

OBITUARY :—
Bemis. John W., Architect, 90
Cope. Walter, Architect, 41
Ferguson. G. H., Architect, 90
Hobrecht. James, Engineer, 9
Munckwitz. Julius F., Architect, 66
Tudor. Frederic, Sanitary Engineer, 41
Wilson. Joseph M., Architect and Engineer, 74

Office of Supervising Architect a Place for ambitious Draughtsmen, 2
" " the Supervising Architect under Mr. Taylor, 1
Organ. A queer Pipe, 48
Ownership of Drawings. The, 96
Ozone as a Purifier of Water, 40

— P —

Painter's Moods. A. By Frederick Crowninshield, 31
Painters. The late Prof. Ogden N. Rood's Service to, 65
Painting. Figure, 73
" Landscape, 74
" Award of the Lazarus Scholarship for Mural, 82

PARIS :—
Architects. Diplomaed and Non-diplomaed, 77
Balloon Accidents. Two recent, 66
Balzac Statue. The, 64
Building-laws. New, 80
Dry-rot Fungus and the Responsibility of Architects, 77
Exhibition of Shop-signs, 8
Letter from, 77
Musée Falguière. The, 48
School of Arts and Crafts to be erected, 4

PARIS :—
Statues of Bruand and Hardouin-Mansart, 8
Park Street Church, Boston, to be removed, 89
" System. Improvement of the Washington, 94
Parkway for Philadelphia. Proposed, 97
Parlor Matches and Fireproofed Wood, 74
Parthenon Frieze Fragment found in an English Garden, 98
Partitions. Sound proof, 5
Pennsylvania Railroad Tunnel. Freezing Process and the, 98
Permanence of Steel and Masonry Construction. Relative, 11, 19
Peterborough Cathedral's West Front, 72
Petroleum used in making Pig-iron, 104
PHILADELPHIA, PA.:—
City-hall. The, 55
Parkway. The proposed, 97
Photographic Processes influencing Artistic Development, 41
Picturesque Roof-coverings, 82
Pig-iron. Use of Petroleum in making, 104
Pinakothek. Restoring the Frescos on the, 16
Pipe-organ. A queer, 48
Pittsfield, Mass. Disposal of Sewage at, 104
Poplar. The Silver-leaf, 24
Portland-cement Concrete. Sea-water and, 40
Portrait-statues. Dryness of many American, 41
Portraits of the Sforzas. Luini's, 64
President of the A. I. A. Annual Address of the, 91
" and the Coal Strike. The, 9
Prize for Prussian Architects. Triennial, 58
Prizes to stimulate Improvement in City Architecture, 49
Programme of the Thirty-sixth Annual Convention of the A. I. A., 78
Protection against High-tension Electricity. A, 2
Prussian Architects. Triennial Prize for, 58
Publicity in a Measure a Correction of Trade-union Tyranny, 65
Pueblo Indian Life in Argentina, S. A. Traces of, 57
Pumice-stone Bricks. German, 32
Pump in Rouen. Electric Fire, 103
Purchasers of reputed "Old Masters." Frauds perpetrated on American, 73
Purification of Sewage, 62
" " Water by Ozone, 40

— Q —

Quarrying by Means of Fire, 96

— R —

Railway Regulations in Germany. Electric, 63
" Ticket in France. The "Collective," 10
Raising Level of the Great Lakes, 40
Rathhaus, Nuremberg. Restoring the Hall in the, 48
Rebuilding of the Tower of St. Mark, 49
Reichsrath Fountain in Vienna, 88
Reinstatement of expelled Union Men by the Courts, 81
Relation of Natural to Artificial Beauty in Landscape, 84
Relative Compressive Strength of Gravel and Broken-stone Concretes, 35
" Permanence of Steel and Masonry Construction, 11, 19
Relics of the Lisbon Earthquake, 32
Rembrandt: A Critical Essay. By Auguste Breal, 38
Repairing he Ypres Town-hall, 96
Report by Carroll I. Wright on the Coal Strike, 25
Residential Districts. Building-regulations in their Application to, 34
Responsibility of Architects and the Dry-rot Fungus, 77
Restoring Hall in the Nuremberg Rathhaus, 48
Restoration of Peterborough Cathedral. The, 72
Restorations. The White House, 94
REVIEWS :—
American Gardens. Edited by Guy Lowell, 95
REVIEWS :—
Eighteenth-century Architecture of Bath. The. By M. A. Green, 21
Glimpses of China and Chinese Homes. By Edward S. Morse, 39
Heating and Ventilating Buildings. By R. C. Carpenter, 103
Measured Drawings of Old Oak English Furniture. By John W. Hurrell, 39
Mediæval London. By William Benham, 38
Painter's Moods. A. By Frederick Crowninshield, 31
Rembrandt: A Critical Essay. By Auguste Breal, 38
Steam Heating and Ventilation. By W. S. Monroe, 6
Theory of Steel Concrete Arches and of Vaulted Structures. By William Cain, 7
Timber. By Paul Charpentier, 103
Rhode Island Anthracite Mine reopened, 89
" " Coal-mines, 1, 17
Right to use Flues in a Party-wall, 72
" " Light and Air, 72
Rivets. Driving large, 93
Rood's Service to Painters. The late Prof. Ogden N., 65
Roof Coverings, Picturesque and Otherwise, and their Defects, 82
Roofs. White-washing Tar and Gravel, 18
Roman Campagna. The Malaria in the, 17
" Catholic Cathedral, London. The, 23
" Forum. Discovery of Tombs in, 16
" and Romanesque France, 13, 70
Ruins. The Zimbabwe, 30
Ruskin's *Seven Lamps of Architecture.* The Manuscript of, 80
Russian Izbas, 64
St. Mark, Venice. Contributions for rebuilding Tower of, 10
" " " The Rebuilding of Tower of, 49
" " " " Tower of, 20

— S —

SANITARY :—
Berlin Sewerage System. The, 9
Gas-leakage into Houses: How it affects Health, 57
Malaria in the Roman Campagna. The, 17
Sewage-disposal at Pittsfield, Mass. 104
Sewage. Purification of, 62
Trees in Cities a Menace to Health, 50
Schenectady Trade-unions and the expelled Militiaman, 81
Scholarship for Mural Painting. Award of the Lazarus, 82
School of Arts and Crafts for Paris, 4
" " Industrial Art. Geneva, 48
School-house for New York. Projected Eight-story, 89
Sculpture Masterpiece rediscovered in Ephesus, 72
Sculptured Monuments. Dryness of many American, 41
Search for the Tiber's Treasures, 71
Sea-water and Portland-cement Concrete, 40
Seismograph and Bridge Vibration. The, 64
Seven Lamps of Architecture. The Manuscript of Ruskin's, 80
Sewage-disposal at Pittsfield, Mass., 104
Sewage. Purification of, 62
Shade-trees in Cities. Evil of, 50
Shakespeare Statue at Elsinore, 8
Siena Church-façade defaced by Street-boys. A, 72
Signs. An Exhibition of Paris Shop, 8
Silver-leaf Poplar. The, 24
Size-limit for Lathe-turned Monolithic Columns, 10
Slag. Steel and Iron, 31
Slate. A simple Test for, 48
Soft Woods. Australian, 22
Soot. Spontaneous Combustion of, 16
Sound-proof Partitions, 6
Spontaneous Combustion of Soot, 16
Spurious Furniture. The Manufacture of, 58
Stand-pipe. Test of a Twenty-story, 64
Stand-pipes in High Buildings. The Utility of, 81
Station, Washington. The new Union, 94
Statue. The Balzac, 64
" of Shakespeare at Elsinore, 8
Statues of Bruand and Hardouin-Mansart, 8
" in Underground Tunnels, 50
Steam Heating and Ventilation. By W. S. Monroe, 6
Steel Billets. An iniquitous Enhancement of Duties on imported, 33
Steel-concrete Arches. Theory of. By William Cain, 7
Steel in Concrete. Experiments on, 24
" Construction. Notes on Iron and, 43, 51
" Frames of Buildings. Corrosion of, 25, 36
" and Iron Slag, 31
" " Masonry Construction. Relative Permanence of, 11, 19, 26
" Trust. Economies of the So-called, 79
Stock Exchange. The New York, 39
Street-signs and the N. Y. Art Commission, 16
Strength of Ferro, or Armored, Concrete, 38
" " Gravel and Broken-stone Concretes. Relative Compressive, 35
Strike. The Coal, 1, 9, 17, 25, 37, 65
" lasting Fifty Years. A, 48
Subway. Difficult Engineering in the New York, 7
Supervising Architect's Office :—
A Place for ambitious Draughtsmen, 2
Under Mr. Taylor, 1
Swiss Lake. Utilizing the Water-power of a, 58

— T —

Tablets from Nippur. The Cuneiform, 16
Tapis. Sur le, 24
Tariff on certain Class of Art. Bill for removing, 90
" " imported Coal. Advisability of Temporary Suspension of the, 90
" " Window-glass. Attempt to remove, 97
Technology to establish a Graduate School of Engineering. Inst. of, 90
Telepherage Mails in Italy, 56
Test for Slate. A simple, 48
" of a Twenty-story Standpipe, 64
Tests of Relative Compressive Strength of Gravel and Broken-stone Concrete, 35
" " the Action of Sea-water upon Portland-cement Concrete, 40
" " " Fire-resisting Qualities of Uralite, 29
Texas Mission Buildings, 16
Thawing Water-pipes by Electricity, 80
Theatre, Munich. Acoustic Changes at the Prince Regent's, 8
Theory of Steel-concrete Arches and of Vaulted Structures. By William Cain, 7
Tiber's Treasures. A Search for the, 71
Timber. Australian, 22
Timber. By Paul Charpentier, 103
Tombs in the Roman Forum. Discovery of, 16
Tower of St. Mark. The, 20
" " " " Contribution for the Rebuilding of, 10
" " " " The Rebuilding of the, 49
Town-hall, Ypres. Repairing the, 96
Town-halls of the Middle Ages. Italian, 3
Trade-union Tyranny. Publicity in a Measure a Correction of, 65
Trade-unions. Blackmailing of Architects by, 65
Trade-unions' Comedy in Australia. The, 2
Trade-unions and the expelled Militiamen. Schenectady, 81
" Incorporation of, 81
Treasures of the Tiber. A Search for the, 71
Treasury Building Exterior, Washington, being cleaned by Sand-blast, 94
Trees in Cities. Evil of Shade, 50
" " Washington. Street side, 88
Trust. Economies of the so-called Steel, 79
" Managements. A Weak Point in, 9
Trusts the Worst. Labor, 37
Tudor, Sanitary Engineer. Death of Frederic, 41
Tunnel for Freight-traffic in Chicago, 50
Tunnels as Sculpture Galleries, 50
Tunnelling. Ventilation in, 16
Turin Exhibition. Success of the, 72
Tyranny of Trade-unions in a Measure corrected by Publicity, 65

— U —

Underground Freight-traffic in Chicago, 50
Union Men reinstated by the Courts. Expelled, 81
" of Wholesale Grocery Employés, Chicago, seeks Incorporation, 2
Uralite, 29
Use of Petroleum in making Pig-iron, 104
Utility of Stand-pipes in High Buildings, 82

— V —

Vauxhall Bridge. R. I. B. A. and the, 74
Venetian Works of Art, 16
Venezuela. The Anglo-Germanic Attack on, 90
VENICE, ITALY :—
St. Mark's Tower, 20
" " " Contributions for the Rebuilding of, 10
" " " The Rebuilding of, 49
Ventilating. Heating and. By R. C. Carpenter, 103
Ventilation. Steam Heating and. By W. S. Monroe, 6
Ventilation in Tunnelling, 16
Vienna. The Reichsrath Fountain in, 88
Vignola. The American, 27
Voice from the Coal Region. A, 7

— W —

Walnut Log. A famous, 32
WASHINGTON, D. C.:—
Buildings. New Commercial, 94
District of Columbia Building. The Competition for the, 94
Improvement of, 101
Letter from, 94
Park System. Improvement of the, 94
Treasury Building Exterior being cleaned by Sand-blast, 94
Trees. Street-side, 88
Union Station. The new, 94
White House. Changes in the, 32
" " Restorations. The, 94
" " Suggested Change in the, 49
Washington University Architectural Course, 57
Water for Apulia. Scheme to provide, 18
" Purified by Ozone, 40
Waterfall near Chihuahua, Mexico, 104
Water-pipes thawed by Electricity, 80
Water-power of the Lake of Tanay Switzerland. Utilizing the, 58
Weak Points in Trust Managements. A, 9
Weather favorable for New England Lumbermen, 89
Wedgwood and its Maker, 24
Westminster Abbey. The Fabric Fund of, 29
" Memorial Window in, 15
White House. Changes in the, 32
" " Restorations. The, 94
" " Suggested Changes in the, 49
White-lead in France. Use of, 56
White-washing Tar and Gravel Roofs, 18
Wilson, Architect and Engineer. Death of Joseph M., 74
Window-glass: Attempt to get it on the Free List, 97
" Trust and the Glass-blowers' Union, 97
Woods. Australian Soft, 22
Works of Art. Bill for placing on Free List certain, 90
" " " Venetian, 16

— Y —

Ypres Town-hall. Repairing the, 96

— Z —

Zimbabwe Ruins. The, 30

ILLUSTRATIONS.

The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation. The abbreviation "Adv." denotes that the illustration was published on an advertising page, common to both the editions.]

APARTMENT-HOUSES.

Apartment Hotel, New York, N. Y. Elliott Lynch, Archt., 1405 (*Reg.*)

"Technology Chambers," Boston, Mass. Kilham & Hopkins, Archts., 1407 (*Int.*)

BRIDGES.

Bridges over the River Cam, Cambridge, Eng : 2 plates, 1406 (*Int.*)

Palladian Bridge: Wilton House, Wiltshire, Eng. Sir William Chambers, Archt., 1406 (*Int.*)

CLUB-HOUSES.

Woman's Club-house, Worcester, Mass. Josephine W. Chapman, Archt., 1409 (*Int.*)

DETAILS.

All Saints' Church, Great Neck, L. I., N. Y. Cram, Goodhue & Ferguson, and Silas McBee, Asso. Archts.: —
- Altar and Reredos, 1400 (*Int.*)
- Choir Details, 1400 (*Int.*)
- Details of Reredos, 1400 (*Int.*)
- " " Rood Screen, 1400 (*Int.*)

Detail of Administration Building: Faulkner Hospital, West Roxbury, Mass. Kendall, Taylor & Stevens, Archts., 1407 (*Reg.*)

" Entrance to Kingsbury Boulevard, St. Louis, Mo. Barnett, Haynes & Barnett, Archt., 1408 (*Reg.*)

" of Lawn Front: House of E. J. Berwind, Esq., Newport, R. I. Horace Trumbauer, Archt., 1404 (*Int.*)

" "Staircase, Nassau House, Bath, Eng., 1399 (*Adv.*)

Doors. Italian Bronze, 1407 (*Int.*)

Doorway to Beau Nash's House, Bath, Eng., 1399 (*Adv.*)

" " the Cloister of St. Trophime, Arles, France, 1405 (*Reg.*)

Doorways, etc., at Aix, Bouches-du-Rhône, France: —
- Hôtel de Panisse, Rue E. David: Hôtel d'Agut, Place des Précheurs, 1401 (*Int.*)
- Tower of St. Augustin: Hôtel d'Espagne, Cours Mirabeau; Door in the Rue Espariat, 1401 (*Int.*)

Entrance to the "Breakers": Estate of Cornelius Vanderbilt, Esq., Newport, R. I., 1405 (*Int.*)

" Pavilion: House of E. J. Berwind, Esq., Newport, R. I. Horace Trumbauer, Archt., 1403 (*Int.*)

" Union Trust Building, Providence, R. I. Stone, Carpenter & Willson, Archts., Daniel C. French, Sculptor, 1402 (*Int.*)

Portico: Deborah Cook Sayles Public Library, Pawtucket, R. I. Cram, Goodhue & Ferguson, Archts., 1398 (*Reg.*)

St. John's Chapel, New York, N. Y.: —
- Detail of Order, 1398 (*Int.*)
- Pulpit and Organ, 1398 (*Int.*)

St. Louis Exposition: — Model of the Mines and Metallurgy Building. T. C. Link, Archt., 1408 (*Int.*): —
- Details of Same, 1408 (*Int.*)

DWELLINGS.

Château de Josselin, Brittany, France. 1409 (*Int.*)

City Residence, New York, N. Y. Robertson & Potter, Archts., 1409 (*Reg.*)

Cottage of J. B. Fallon, Esq., Jamaica Plain, Mass. Loring & Phipps, Archts., 1403 (*Reg.*)

Country House. Robertson & Potter, Archts., 1408 (*Reg.*)

Derwent Hall, Derbyshire, Eng., 1406 (*Int.*)

(*Dwellings Continued.*)

Garden Front and Dining-room: House of Murry Nelson, Jr., Winnetka, Ill. C. A. Platt and W. A. Otis, Associated Archts., 1404 (*Int.*)

House Front, Paris, France. M. Lavirotte, Archt., 1398 (*Reg.*)

" of E. J. Berwind, Esq., Newport, R. I. Horace Trumbauer, Archt., 1403 (*Int.*): —
- Detail of Lawn Front, 1404 (*Int.*)
- Entrance Pavilion, 1403 (*Int.*)
- Lawn Front, 1400 (*Int.*)

" " Mrs. Wirt Dexter, Boston, Mass. Little & Browne, Archts., 1409 (*Int.*)

" " James Means, Esq., Boston, Mass. Little & Browne, Archts., 1401 (*Reg.*): —
- Lower Stories, 1401 (*Int.*)

" " Rev. Daniel Merriman, Boston, Mass. Little & Browne, Archts., 1404 (*Int.*)

" " Rollins Morse, Esq., Newport, R. I. Ogden Codman, Jr., Archt., 1399 (*Int.*): —
- Courtyard, 1399 (*Reg.*)
- Entrance to Estate, 1399 (*Int.*)

" " Bradford Norman, Esq., Portsmouth, R. I. Winslow & Bigelow, Archts., 1401 (*Reg.*)

" " W. H. Oakes, Waban, Mass. Shepley, Rutan & Coolidge, Archts., 1400 (*Int.*)

" for Arthur W. Pope, Esq. G. H. Ingraham, Archt., 1400 (*Reg.*)

" of Mrs. Catherine Smith, Jamaica Plain, Mass. J. H. Morse, Archt., 1407 (*Reg.*)

" " Mr. J. M. Sullivan, Jamaica Plain, Mass. J. C. Fowler, Archt., 1407 (*Reg.*)

" on Woodlawn Avenue, Chicago, Ill. W. A. Otis, Archt., 1402 (*Reg.*)

" in Detroit, Mich. G. H. Ingraham, Archt., 1401 (*Reg.*)

Plans and Library: House on Woodlawn Ave., Chicago, Ill. W. A. Otis, Archt., 1404 (*Int.*)

Residence at Torrington, Conn. E. G. W. Dietrich, Archt., 1401 (*Reg.*)

ECCLESIASTICAL.

All Saints' Church, Great Neck, L. I., N. Y. Cram, Goodhue & Ferguson, and Silas McBee, Associated Architects: —
- Altar and Reredos, 1400 (*Int.*)
- Choir Details, 1400 (*Int.*)
- Details of Reredos, 1400 (*Int.*)
- " " Rood Screen, 1400 (*Int.*)

Chapel of the Seminary, Issy, Seine, France. Edouard Berard, Archt., 1402 (*Int.*): —
- Sections of Same, 1402 (*Int.*)

" " " Troy Orphan Asylum, Troy, N. Y. Warren, Smith & Biscoe, Archts., 1409 (*Reg.*)

Church and Parish House for St. Mark's Parish, Paterson, N. J. H. M. Congdon & Son, Archts., 1409 (*Reg.*)

Competitive Designs for a Swedish Church, 140. (*Int.*)

Emanuel Church, Newport, R. I. Cram, Goodhue & Ferguson, Archts., 1406 (*Reg.*): —
- Interior of Same, 1406 (*Reg.*)

First Baptist Church, Watertown, Mass. G. B. Dunham, Archt.: —
- Auditorium and Chapel, 1398 (*Int.*)
- " " Cloister, 1398 (*Int.*)

(*Ecclesiastical Continued.*)

Interior of the Church of St. Paul, Basel, Switzerland. Curjel & Moser. Archts., 1403 (*Reg.*)

" " " Collegiate Church, Nantes, Brittany, France, 1409 (*Int.*)

Presbyterian Church, Craigsville, Va, Warren, Smith & Biscoe, Archts., 1407 (*Reg.*)

Roman Catholic Cathedral, Westminster, London, Eng. J. F. Bently & Son, Archts., 1399 (*Int.*)

Rood Screen: All Saints' Church, Great Neck, L. I., N. Y. Cram, Goodhue & Ferguson, and Silas McBee, Associated Archts., 1399 (*Int.*)

St. John's Chapel, New York, N. Y.: —
- Detail of Order, 1398 (*Int.*)
- Pulpit and Organ, 1398

" Stephen's Catholic Church, Warwick, N. Y. Elliott Lynch, Archt., 1398 (*Int.*)

Zabriskie Memorial Chapel, Newport, R. I. F. C. Withers, Archt., 1401 (*Int.*)

EDUCATIONAL.

Horace Mann School, Winnetka, Ill. W. A. Otis, Archt., 1402 (*Reg.*)

Rhode Island Normal School, Providence, R. I. Martin & Hall, Archts., 1404 (*Reg.*): —
- Detail of Same, 1404 (*Reg.*)

Royal Academic High School for the Arts of Building and Music, Charlottenburg, Prussia. Kayser & Van Groszheim, Archts., 1405 (*Int.*)

HOSPITALS.

Faulkner Hospital, West Roxbury, Mass. Kendall, Taylor & Stevens, Archts., 1407 (*Reg.*): —
- Detail of Administration Building, 1407 (*Reg.*)

HOTELS.

Design for Beacon Boulevard Hotel, Brookline, Mass. C. H. Blackall, Archt., 1403 (*Reg.*)

Red Swan Inn, Warwick, N. Y. E. G. W. Dietrich, Archt., 1399 (*Reg.*)

Valley Park Inn, Valley Park, Mo. C. M. Bartberger, Archt., 1403 (*Reg.*)

INTERIORS.

Bedchamber of Françoise de Foix, Chateaubriand, Brittany, France, 1409 (*Int.*)

Dining-room for O. W. Mink, Esq., Manchester-by-the-Sea, Mass. C. H. Blackall, Archt., 1400 (*Reg.*)

" House of Murry Nelson, Jr., Winnetka, Ill. C. A. Platt and W. A. Otis, Associated Archts., 1404 (*Int.*)

Emanuel Church, Newport, R. I. Cram, Goodhue & Ferguson, Archts., 1406 (*Reg.*)

First Baptist Church, Watertown, Mass. C. B. Dunham, Archt.: —
- Auditorium and Chapel, 1398 (*Int.*)
- " 1398 (*Int.*)

Interior of the Church of St. Paul Basel, Switzerland. Curjel & Moser, Archts., 1403 (*Reg.*)

" " " Collegiate Church, Nantes, Brittany, France, 1409 (*Int.*)

" " a House in Chicago, Ill. W. A. Otis, Archt., 1408 (*Int.*)

Library: House on Woodlawn Ave., Chicago, Ill. W. A. Otis, Archt., 1404 (*Int.*)

LIBRARIES.

Competitive Design for the: —
- Boston Athenæum, Boston, Mass. J. A. Schweinfurth, Archt., 1403 (*Int.*): —
- Sections of Same, 1403 (*Int.*)

(*Libraries Continued.*)

Competitive Design for the: —
- Carnegie Library, Burlington, Vt Smith & Walker, Architects, 1398 (*Int.*)
- " " Nashville, Tenn. Ferry & Clas, Architects, 1399 (*Reg.*)

Deborah Cook Sayles Public Library, Pawtucket, R. I. Cram, Goodhue & Ferguson, Archts., 1398 (*Int.*): —
- Portico, 1398 (*Reg.*)

MERCANTILE.

Design for Bank Building, Dubois, Pa. D. C. Myers and M. L. Fisher, Archts., 1406 (*Reg.*)

Institution for Savings in Roxbury, Boston, Mass. Peabody & Stearns, Archts., 1407 (*Int.*)

Warehouse for Studebaker Bros. Mfg. Company, Kansas City, Mo. Root & Siemens, Archts., 1406 (*Reg.*)

MISCELLANEOUS.

Alterations to the Mayor's Office, City-hall, New York. W. M. Aiken, Consulting Archt.: 2 Plates, 1398 (*Reg.*)

Bakery Building, Pittsburgh, Pa. C. M. Bartberger, Archt., 1398 (*Reg.*)

Bedchamber of Françoise de Foix, Chateaubriand, Brittany, France, 1409 (*Int.*)

Circular Greek Temple for Mr. Benjamin Barker, Tiverton, R. I. W. W. Bosworth, Archt., 1400 (*Reg.*)

Entrance to Kingsbury Boulevard, St. Louis, Mo. Barnett, Haynes & Barnett, Archts., 1408 (*Reg.*): —
- Detail of Same, 1408 (*Reg.*)

Les Aliscamps, Arles, France; View of the Amphitheatre, Arles, France, 1405 (*Reg.*)

Louisiana Purchase Exposition, St. Louis, Mo.: —
- Administration Building, 1398 (*Adv.*)
- Fine-Arts Building. Cass Gilbert, Archt., 1397 (*Adv.*)
- Manufactures Building, 1398 (*Adv.*)
- Mines and Metallurgy Building. Model of. T. C. Link, Archt., 1408 (*Int.*)
- Details of Same, 1408 (*Int.*)
- Textiles Building. Eames & Young, Archts., 1398 (*Adv.*)
- Corner of Same, 1397 (*Adv.*)
- U. S. Government Building, 1301 (*Reg.*)

James Russell Lowell Memorial Gates, Cambridge, Mass. J. T. Kelley, Archt., 1405 (*Reg.*)

Sarcophagi in the Musée Lapidaire, Arles, France, 1405 (*Int.*)

Superposition and Intercolumniation, 1400 (*Reg.*)

Turin Exhibition of 1902: —
- Austrian Villa. Baumann, Archt., 1408 (*Reg.*)
- Main Entrance. R. D'Aronco, Archt., 1406 (*Int.*)
- Vestibule of German Section. H. Behrens, Archt., 1306 (*Int.*)

View in Charleston, S. C., 1400 (*Adv.*)

OFFICE-BUILDINGS.

Blair Building, New York, N. Y. Carrère & Hastings, Archts., 1402 (*Reg.*)

Office-building, St. Louis, Mo. Barnett, Haynes & Barnett, Archts., 1408 (*Int.*)

Union Trust Building, Providence. R. I. Stone, Carpenter & Willson, Archts., 1402 (*Int.*) —
- Entrance, 1402 (*Int.*)

13 and 15 Beacon Street, Boston, Mass. C. H. Blackall, Archt., 1400 (*Reg.*)

PUBLIC BUILDINGS.

City-hall, Worcester, Mass. Peabody & Stearns, Archts., 1408 (*Int.*)

Communal Hall, Piacenza, Italy, 1397 (*Int.*)

(*Public Buildings Continued.*)

Competitive Design for the City-hall, Newark, N. J. Rankin & Kellogg, Archts.: 2 Plates, 1397 (*Int.*)

Ducal Palace, Venice, Italy: Palazzo Pubblico, Perugia, Italy, 1397 (*Reg.*)

Hall of the Fraternity of St. George, Genoa, Italy; Palazzo del Comune, Pistoja, Italy, 1397 (*Reg.*)

" " " Jurisconsults, Cremona, Italy, 1397 (*Int.*)

(*Public Buildings Continued.*)

Palazzo Apostolico, Orvieto, Italy: Palazzo de' Consoli, Gubbio, Italy, 1397 (*Reg.*)

" Comunale, Cremona, Italy; Palazzo Comunale, Piacenza, Italy, 1397 (*Reg.*)

" " Todi, Italy; Palazzo del Podestà, Florence, Italy, 1397 (*Reg.*)

(*Public Buildings Continued.*)

Palazzo della Signoria, Siena, Italy; Palazzo Vecchio, Florence, Italy, 1397 (*Reg.*)

U. S. Government Building, Louisiana Purchase Exposition, St. Louis, Mo. J. K. Taylor, Supervising Archt., 1401 (*Reg.*)

RAILROAD STATIONS.

Station of the Electric Elevated and Underground Railway, Berlin, Germany. Grisebach & Dinklage, Archts., 1401 (*Int.*)

STABLES.

Stable for the Standard Coach House Company, New York, N. Y. Ludlow & Valentine, Archts., 1409 (*Reg.*)

" " Mrs. J. B. Williams, Cohasset, Mass. J. A. Schweinfurth, Archt., 1404 (*Reg.*)

THEATRES.

Stadt Theatre, Cologne, Germany. Karl Moritz, Archt., 1406 (*Int.*)

TEXT CUTS.

[*The figures refer to the page of text, not to the number of the journal.*]

American Vignola Diagrams, 27, 28, 29

Aqueduct, Fréjus. Portion of, 14

Bridge over the Quai Debilly, Paris. Longitudinal Section of, 75

" Cross Section of a, 75

Courtyard of the Bargello, Florence, 3

Dome of the Museum of the Egyptian Antiquities, Cairo, Egypt, 77

Footbridge over Railroad, Lorient, France, 75

Fréjus and the Lantern. General View of, 14

Guard-house for Orleans Railroad, France. Transportable, 76

Limekiln, Luzech, France, 76

Retaining-wall of the Quai Debilly, Paris, 77

Roman Ruin, Fréjus, 14

Staircase in the Palace of Fine-Arts, Paris Exposition of 1900, 77

Widcombe House, Bath, Eng., 22

INDEX BY LOCATION.

[*The figures refer to the number of the journal, not to the page, and the Edition is indicated in italic abbreviation.*]

— A —

Aix, Bouches-du-Rhône, France. Doorways, etc.: —

Hôtel de Panisse, Rue E. David; Hôtel d'Agut, Place des Précheurs, 1401 (*Int.*)

Tower of St. Augustin; Hôtel d'Espague, Cours Mirabeau; Door in the Rue Espariat, 1401 (*Int.*)

Arles, France. Les Aliscamps; View of the Amphitheatre, 1405 (*Reg.*)

" " Doorway to the Cloister of St. Trophîme, 1405 (*Reg.*)

" " Sarcophagi in the Musée Lapidaire, 1405 (*Int.*)

— B —

Basel, Switzerland. Interior of the Church of St. Paul. Curjel & Moser, Archts., 1403 (*Reg.*)

Bath, Eng. Doorway to Beau Nash's House, 1399 (*Adv.*)

" " Detail of Staircase, Nassau House, 1399 (*Adv.*)

Benevento, Italy. Door to the Cathedral, 1407 (*Int.*)

Berlin, Ger. Station of the Electric Elevated and Underground Railway. Grisebach & Dinklage, Archts., 1401 (*Int.*)

BOSTON, MASS.: —

Competitive Design for the Boston Athenæum. J. A. Schweinfurth, Archt., 1403 (*Int.*): —

Sections of Same, 1403 (*Int.*)

House of Mrs. Wirt Dexter. Little & Browne, Archts., 1409 (*Int.*)

" " James Means, Esq. Little & Browne, Archts., 1401 (*Reg.*): —

Lower Stories, 1401 (*Int.*)

" " Rev. Daniel Merriman. Little & Browne, Archts., 1404 (*Int.*)

Institution for Savings, Roxbury. Peabody & Stearns, Archts., 1407 (*Int.*)

"Technology Chambers." Kilham & Hopkins, Archts., 1407 (*Int.*)

13 and 14 Beacon St. C. H. Blackall, Archt., 1400 (*Reg.*)

Brittany, France. Château de Josselin, 1409 (*Int.*)

Brookline, Mass. Design for Beacon Boulevard Hotel. C. H. Blackall, Archt., 1403 (*Reg.*)

Burlington, Vt. Competitive Design for the Carnegie Library. Smith & Walker, Archts., 1398 (*Int.*)

— C —

Cambridge, Eng. Bridges over the River Cam: 2 Plates, 1406 (*Int.*)

" Mass. James Russell Lowell Memorial Gates. J. T. Kelley, Archt., 1405 (*Reg.*)

Charleston, S. C. View in, 1400 (*Adv.*)

Charlottenburg, Prussia. Royal Academic High School for the Arts of Building and Music. Kayser & Van Groszheim, Archt., 1405 (*Int.*)

Châteaubriand, Brittany, France. Bedchamber of Françoise de Foix, 1409 (*Int.*)

Chicago, Ill. House on Woodlawn Ave. W. A. Otis, Archt., 1402 (*Reg.*)

" " Interior of a House. W. A. Otis, Archt., 1408 (*Int.*)

" " Plans and Library: House on Woodlawn Ave. W. A. Otis, Archt., 1404 (*Int.*)

Cohasset, Mass. Stable for Mrs. J. B. Williams. J. A. Schweinfurth, Archt., 1404 (*Reg.*)

Cologne, Ger. Stadt Theatre. Karl Moritz, Archt., 1406 (*Int.*)

Craigsville, Va. Presbyterian Church. Warren, Smith & Biscoe, Archts., 1407 (*Reg.*)

Cremona, Italy. Hall of the Jurisconsults, 1397 (*Int.*)

" " Palazzo Comunale, 1397 (*Reg.*)

— D —

Derbyshire, Eng. Derwent Hall, 1406 (*Int.*)

Detroit, Mich. House. C. H. Ingraham, Archt., 1401 (*Reg.*)

Dubois, Pa. Design for Bank Building. D. C. Myers and M. L. Fisher, Archts., 1406 (*Reg.*)

— F —

Florence, Italy. Detail from South Door of the Baptistery, 1407 (*Int.*)

Florence, Italy. Main Door of the Baptistery, 1407 (*Int.*)

" " North Door of the Baptistery, 1407 (*Int.*)

" " South Door of the Baptistery, 1407 (*Int.*)

" " Palazzo del Podestà, 1397 (*Reg.*)

" " " Vecchio, 1397 (*Reg.*)

— G —

Genoa, Italy. Hall of the Fraternity of St. George, 1397 (*Reg.*)

Great Neck, L. I., N. Y. All Saints' Church. Cram, Goodhue & Ferguson and Silas McBee, Associate Archts.: —

Altar and Reredos, 1400 (*Int.*)

Choir Details, 1400 (*Int.*)

Details of Reredos, 1400 (*Int.*)

" " Rood Screen, 1400 (*Int.*)

Rood Screen, 1399 (*Int.*)

Gubbio, Italy. Palazzo de' Consoli, 1397 (*Reg.*)

— I —

Issy, Seine, France. Chapel of the Seminary. Edouard Berard, Archt., 1402 (*Int.*): —

Sections of Same, 1402 (*Int.*)

— J —

Jamaica Plain, Mass.: —

Cottage of J. B. Fallon, Esq. Loring & Phipps, Archts., 1403 (*Reg.*)

House of Mrs. Catherine Smith. J. H. Morse, Archt., 1407 (*Reg.*)

" " J. M. Sullivan. J. C. Fowler, Archt., 1407 (*Reg.*)

— K —

Kansas City, Mo. Warehouse for Studebaker Bros. Mfg. Co. Root & Siemens, Archts., 1406 (*Reg.*)

— L —

London, Eng. Roman Catholic Cathedral. J. F. Bently & Son, Archts., 1399 (*Int.*)

Lucca, Italy. Door to the Palazzo Orsetti, 1407 (*Int.*)

" " " in the Sacristy of S. Frediano, 1407 (*Int.*)

" " Principal Door to the Cathedral, 1407 (*Int.*)

— M —

Manchester-by-the-Sea, Mass. Dining-room for O. W. Mink, Esq. C. H. Blackall, Archt., 1400 (*Reg.*)

Monreale, Sicily. Main Door to the Cathedral, 1407 (*Int.*)

" " Side Door to the Cathedral, 1407 (*Int.*)

— N —

Nantes, Brittany, France. Interior of the Collegiate Church, 1409 (*Int.*)

Nashville, Tenn. Competitive Design for the Carnegie Library. Ferry & Clas, Archts., 1399 (*Reg.*)

Newark, N. J. Competitive Design for the City-hall. Rankin & Kellogg, Archts.: 2 Plates, 1397 (*Int.*)

Newport, R. I.: —

Emanuel Church. Cram, Goodhue & Ferguson, Archts., 1406 (*Reg.*): —

Interior of Same, 1406 (*Reg.*)

Entrance to the "Breakers": Estate of Cornelius Vanderbilt, 1405 (*Int.*)

House of E. J. Berwind, Esq. Horace Trumbauer, Archt., 1403 (*Int.*): —

Detail of Lawn Front 1404 (*Int.*)

Entrance Pavilion, 1403 (*Int.*)

Lawn Front, 1400 (*Int.*)

" " Rollins Morse, Esq. Ogden Codman, Jr., Archt., 1399 (*Int.*): —

Court-yard, 1399 (*Reg.*)

Entrance to Estate, 1399 (*Int.*)

Zabriskie Memorial Chapel. F. C. Withers, Archt., 1401 (*Int.*)

NEW YORK, N. Y.: —

Alterations to the Mayor's Office, City-hall. W. M. Aiken, Consulting Archt.: 2 Plates, 1398 (*Reg.*)

Apartment Hotel. Elliott Lynch, Archt., 1405 (*Reg.*)

Blair Building. Carrère & Hastings, 1402 (*Reg.*)

City Residence. Robertson & Potter, Archts., 1409 (*Reg.*)

St. John's Chapel: —

Detail of Order, 1398 (*Int.*)

Pulpit and Organ, 1398 (*Int.*)

New York, N. Y.:—
Stable for the Standard Coach Horse Co. Ludlow & Valentine, Archts., 1409 (*Reg.*)

—O—

Orvieto, Italy. Palazzo Apostolico, 1397 (*Reg.*)

—P—

Paris, France:—
House Front. M. Lavirotte, Archt., 1398 (*Reg.*)

Parma, Italy. Door to the Museum of Antiquities, 1407 (*Int.*)
" " " of the Small Theatre in the Pinacoteca, 1407 (*Int.*)

Paterson, N. J. Church and Parish House for St. Mark's Parish. H. M. Congdon & Son, Archts., 1409 (*Reg.*)

Pawtucket, R. I. Deborah Cook Sayles Public Library. Cram, Goodhue & Ferguson, Archts., 1398 (*Int.*):—
Portico, 1398 (*Reg.*)

Perugia, Italy. Palazzo Pubblico, 1397 (*Reg.*)

Piacenza, Italy. Communal Hall, 1397 (*Int.*)
" " Palazzo Comunale, 1397 (*Reg.*)

Pisa, Italy. John of Bologna's Door in the Cathedral, 1407 (*Int.*)

Pistoja, Italy. Door to the Baptistery, 1407 (*Int.*)
" " Palazzo del Comune, 1397 (*Reg.*)

Pittsburgh, Pa. Bakery Building. C. M. Bartberger, Archt., 1398 (*Reg.*)

Portsmouth, R. I. House of Bradford Norman, Esq. Winslow & Bigelow, Archts., 1401 (*Reg.*)

Providence, R. I. Rhode Island Normal School. Martin & Hall, Archts., 1404 (*Reg.*):—
Detail of Same, 1404 (*Reg.*)
" " Union Trust Building. Stone, Carpenter & Willson, Architects, 1402 (*Int.*):—
Entrance, 1402 (*Int.*)

—S—

St. Louis, Mo.:—
Entrance to the Kingsbury Boulevard. Barnett, Haynes & Barnett, Archts., 1408 (*Reg.*):—
Detail of Same, 1408 (*Reg.*)

Louisiana Purchase Exposition:—
Administration Building. 1398 (*Adv.*)
Fine-Arts Building. Cass Gilbert, Archt., 1397 (*Adv.*)
Manufactures Building, 1398 (*Adv.*)
Mines and Metallurgy Building. Model of. T. C. Link, Archt., 1408 (*Int.*)
Details of Same, 1408 (*Int.*)
Textiles Building. Eames & Young, Archts., 1398 (*Adv.*)

St. Louis, Mo.:—
Louisiana Purchase Exposition:—
Corner of Same, 1397 (*Adv.*)
U. S. Government Building, 1401 (*Reg.*)
Office-building. Barnett, Haynes & Barnett, Archts., 1408 (*Int.*)

Siena, Italy. Door to the Abbey of Monte Oliveto Maggiore, 1407 (*Int.*)
" " Palazzo della Signoria, 1397 (*Reg.*)

—T—

Tiverton, R. I. Circular Greek Temple for Benjamin Barker, Esq. W. W. Bosworth, Archt., 1400 (*Reg.*)

Todi, Italy. Palazzo Comunale, 1397 (*Reg.*)

Torrington, Conn. Residence. E. G. W. Dietrich, Archt., 1401 (*Reg.*)

Troy, N. Y. Chapel of the Troy Orphan Asylum. Warren, Smith & Biscoe, Archts., 1409 (*Reg.*)

Turin Exhibition of 1902:—
Austrian Villa. Baumann, Archt., 1408 (*Reg.*)
Main Entrance. R. D'Aronco, Archt., 1406 (*Int.*)
Vestibule of German Section. P. Behrens, Archt., 1306 (*Int.*)

—V—

Valley Park, Mo. Valley Park Inn. C. M. Bartberger, Archt., 1403 (*Reg.*)

Venice, Italy. Ducal Palace, 1397 (*Reg.*)

Verona, Italy. Door to San Zeno Maggiore, 1407 (*Int.*)

—W—

Waban, Mass. House of W. H. Oakes, Esq. Shepley, Rutan & Coolidge, Archts., 1400 (*Int.*)

Warwick, N. Y. Red Swan Inn. E. G. W. Dietrich, Archt., 1399 (*Reg.*)
" " St. Stephen's Catholic Church. Elliott Lynch, Archt., 1398 (*Int.*)

Watertown, Mass. First Baptist Church. C. B. Dunham, Archt.:—
Auditorium and Chapel, 1398 (*Int.*)
" " Cloister, 1398 (*Int.*

West Roxbury, Mass. Faulkner Hospital. Kendall, Taylor & Stevens, Archts., 1407 (*Reg.*):—
Detail of Administration Building, 1407 (*Reg.*)

Wiltshire, Eng. Palladian Bridge: Wilton House. Sir William Chambers, Archt., 1406 (*Int.*)

Winnetka, Ill. Garden Front and Dining-room: House of Murry Nelson, Jr. C. A. Platt and W. A. Otis, Asso. Archts., 1404 (*Int.*)
" " Horace Mann School. W. A. Otis, Archt., 1402 (*Reg.*)

Worcester, Mass. City-hall. Peabody & Stearns, Architects, 1408 (*Int.*)
" " Woman's Clubhouse. Josephine W. Chapman, Archt., 1409 (*Int.*)

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, JANUARY 4, 1902 No. 1358

CONTENTS

SUMMARY: —
The International Edition in Quarterly Form. — The new Building Commissioner of New York asks Aid of the Architects. — Death of Edw. Onslow Ford, Sculptor. — The Fire-loss for 1901. — The Direct Employment of Labor by Owners. — The Real Value and Usefulness of the Contractor. — The Attitude of the German Emperor towards certain Artists and their Work. — The Value of Forests as Producers of Oxygen. — Threatened Rise in the Price of Window-glass. 1
NOTES ON IRON AND STEEL CONSTRUCTION. — I. 3
THE CATHEDRALS ONE WILL NEVER SEE. 5
BOOKS AND PAPERS. 6
ILLUSTRATIONS: —
New Theatre, Corner of Tremont St. and Van Rensselaer Place, Boston, Mass. — Section of same Building — Cathedrals that One will never see: — Laon; Strasbourg; Rheims; Amiens; Chartres; Paris; Beauvais.
Cancello della Villa Massimi, in Via Merulana, Rome, Italy.
Additional: The Atlantic Building, Wall and William Sts., New York, N. Y. — Detail of the Same. — Detail of Central Fountain: Villa Lante, Bagnaia, Italy. — Drummond Castle, from the South. — Deciduous Cypress: Villa Doria-Pamphili, Rome, Italy. — Gateway: Hampton Court Palace; Gateway: Syon House, Middlesex, Eng. 7
NOTES AND CLIPPINGS. 7

TOO late in the season to allow us to perfect our plans and make announcement earlier, we determined to make a change in the manner and method of publishing our International edition, and we now give notice that the change impends and will have effect in the second quarter of the year. The change consists simply in gathering the extra illustrations which constitute the International edition into four quarterly issues in place of their being, as now, scattered through thirteen weekly issues. The result will be that the subscriber to the International edition will receive each week a copy of the Regular edition and with each quarter a quarterly volume in which will be collected the gelatine and other International plates. That is, a subscriber will receive exactly what he now receives, but it will reach him in what, we believe, will be a more acceptable and agreeable form. Amongst other advantages incident to this condensation of matter is the fact that it will enable us to publish in the same issue all the plates in illustration of a given building, instead of being forced to let them dribble out, a few at a time, in four or five different weekly issues, as in the past.

MR. P. M. STEWART, the new Building Commissioner for the Borough of Manhattan, has had an excellent idea, although it is not, as yet, very evident how he is to carry it out. Realizing the superiority of foreign cities to New York in imposing and beautiful general effects, he has formally invited "the American Society of Architects," which, we suppose, means the New York Chapter of the Institute, to coöperate with his Department "in securing, so far as is practicable, more artistic effects in the city's architecture." The "American Society of Architects" will, we are sure, be very happy to lend all the aid in its power to this excellent scheme, and the public will bless both it and Mr. Stewart for whatever they may be able to accomplish in the desired direction, but it is not so clear how they are likely to be able to accomplish anything. Under the present New York building-laws, any man can, practically, construct anything he likes on his land, provided it is reasonably incombustible; and regulations like those in force in Europe, where Governments exercise their police power in regulating the heights of cornices and string-courses, while admirable in their effect on the artistic beauty of cities, would hardly be suited to our notions of individual liberty.

IT should, however, be remembered that the best effects of city architecture in Europe are not the result of police regulation, but of voluntary agreement. The Rue de Rivoli, in Paris, for example, which excites the admiration of all foreigners by the continuous arcading of the sidewalk, and its long, level lines of cornices, string-courses and balconies, was formed by the municipality, which, desirous of widening the narrow, dirty passageway, bordering the grounds of the Tuileries and the Louvre, acquired the lots facing on these passageways; and, after laying out a broad street, resold what was left of the lots, facing on the street, subject to the condition that all structures erected on these lots should have the first story uniformly arcaded, and should have the string-courses and main cornices at fixed levels. Although this transaction took place nearly a hundred years ago, the street, thanks to the foresight of those who planned it, is as attractive as ever. Around the Rond-Point de l'Étoile, which dates from the same period, and was laid out in the same way, the regulations are even more strict, and the uniformity extends even to the decorations of the fronts. In many cases in this country it would be possible to apply similar restrictions, and the city of Boston, for example, has lost a great opportunity to control the constructions on the lots fronting on its beautiful park, where, in consideration of the privilege of access from the park avenues, it has imposed only a few meagre regulations where it might have insisted on its own terms, to the great advantage of the lot-owners, as well as of the public.

THE world has lost a brilliant artist in the sculptor, Onslow Ford, who died in London a few days ago, at the age of forty-nine. Ford was in some respects the most remarkable sculptor of his time. Without the obtrusive eccentricity of some of the more original French artists, he was independent and imaginative to a degree which is rare among sculptors anywhere, and particularly so in England. Most of his artistic training was obtained abroad, and it is not impossible that his peculiar freedom of thought may have been, in part, the result of his varied experience and study. He belonged to a poor family, and, when only a boy of seventeen, he was taken from London to Dunkirk. Here he pursued the artistic studies for which he had already shown an aptitude under the direction of an old Frenchman. Later, he entered the School of Fine Arts in Antwerp, and studied drawing and painting there for nearly two years. From Antwerp circumstances took him to Munich, where he was led to turn his attention from painting to sculpture. His studies were interrupted by the necessity of returning to London for a time, but he afterwards went back to Munich to complete them. Returning again to England, he found employment in portraiture, and it was some time before an opportunity was afforded him for a work of real imagination. The first, perhaps, of these was a statue of General Gordon, which he was commissioned to execute for the city of Birmingham. Instead of presenting the eccentric hero on horseback, with the conventional cloak over his shoulder, he mounted him on a camel, contrasting his simple uniform with the embroidered and fringed trappings of the animal. This work brought him fame, and he soon had plenty of commissions. One of his last works was a figure of Shelley, for the University of Oxford, which shows the poet as he lay dead on the beach of the Gulf of Spezia, after his body was dragged from the water by his friends.

THE total of fire-losses for 1901 will amount, it is said, to more than one hundred and sixty million dollars in the United States and Canada, and we are treated to the usual rumors that "property-owners are to be forced to lessen the fire-hazard," and so on, which mark the close of the insurance year. There is no doubt that the fire-loss, to which must be added, probably, a hundred millions more for cost of maintaining insurance companies and fire protection, is too large. As we have before suggested, the money spent by the people of the United States every year in making bonfires of their goods, and trying, in vain, to put them out, would just about keep the entire population supplied with boots and shoes. Now, the idea of free boots and shoes perpetually for everybody is quite sufficient to make the fathers and mothers of families prick up their ears, and there is no danger that a real remedy for the evils of fire would not attract public attention. The trouble is that the underwriters, who could easily carry out any measures that they might agree upon, content themselves mainly with grumbling and threatening. Not long ago, according to the New York *Evening Post*, the manager of a property insured for several hundred thousand dollars, after reading, apparently, some of the eloquent speeches at an underwriters' banquet, was touched in his conscience, and inquired into the cost of proper

Copyright, 1901, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

protection against fire for the property which he had at risk. He found that the expense would be more than the amount of his present premiums for several years, and, like a conscientious man, he abandoned the project, feeling that he could not honestly sacrifice the interests of the owners of the property to a private fancy. We have ourselves had the same experience more than once, and until it is made for the interest of owners to use methods of protection against fire, it is very certain that few of them will do so.

THE English newspapers are being supplied, apparently by industrious "champions of labor," with a good deal of literature on the subject of the abolition of contractors, and the substitution of the system of the "direct employment of labor" by owners. Architects who have seen something of the "direct employment of labor" by people rich enough, and inexperienced enough, to be easy victims, will not be surprised that the suggestion should be received with cries of joy by the radical "friends of the toilers," but the other side has begun to take part in the discussion, and interesting facts, for the time, replace theories and predictions. One contractor, Mr. Wallis, writes an admirable letter to the *Builder*, asking why the experience of the contractor should not be of as much value in the business of construction as in any other; and refers to the costly experiment made by the London County Council, which was deluded into the notion that it could save twenty-five per cent of the cost of municipal work by being its own contractor, and, instead of that, after a series of disgraceful scandals, considered itself fortunate in being able to get work poorly and inefficiently done for a sum not very much greater than the cost of having it rapidly and efficiently executed by contract.

MR. WALLIS mentions some instances from his own experience of the result of encouraging rich and unsuspecting owners to employ labor "directly," either in building or engineering operations, which will not surprise architects. In one case, he saw five men and an overseer engaged, at good wages, in fishing an empty oil-barrel out of the water into which it had fallen; and in a fitting-shop he saw twenty-five men, also at good wages, employed in standing still, watching the two remaining men who alone made any pretence of doing any work. As to the influence of trades-unions on the efficiency of labor, about which there is so much dispute, he observes that men in places where there are no unions do, on an average, twice as much work in a day as in cities, where the unions rule the workmen.

WE imagine that American architects could add something to the illustrations of the difference in results between the "direct employment of labor" and the entrusting of the work to be done to a good contractor. We do not dare to say how many old packs of playing-cards we have found concealed near where some "labor" had been "directly employed" for several weeks by a wealthy proprietor, or how many empty whiskey-bottles were discovered under similar circumstances in another case. Of course, much work can only be done, or can be done most cheaply, by the day, and with an honest contractor to look after the men, at a reasonable compensation, there is no disadvantage in the system; but the time when all workmen can be trusted to labor faithfully and intelligently for an employer who has plenty of money, and does not have leisure to look after them, has not yet come, and will not come until politicians and college professors cease to hold up employers as "greedy monopolists," who have "seized upon the means of existence," by "exploiting the toilers," and whom it is desirable, in the interest of abstract justice, for the "toilers" to plunder in their turn whenever they get a chance.

THE Emperor of Germany has been unfortunate in incurring the hostility of certain artists who were not treated by him with the consideration which they thought they deserved, but he seems, notwithstanding their criticisms, to have very clear and excellent ideas in regard to art; and, in a recent speech, delivered at a dinner given in the palace to the artists of the Sieges-Allée, he gave good reasons for the favoritism with which he has been so much reproached. Concerning the present tendency of art to advertise itself by newspaper clamor, by the imitation of fashionable masters, and by a search for startling effects, he said, with justice, that the best way to counteract this degrading movement was for those in a position to command to seek out artists of great talent, and attach them to their courts, giving them liberty and opportunity to work out, under the protection of their patron, the inspiration of their hearts. The Emperor, in support of this theory, said that it was in this way that the great schools of art of the Middle Ages and the Italian Renaissance were formed, and, although the complete accuracy of this statement is, as a matter of history, doubtful, there is, at least, enough truth in it to confirm his view that in all ages, and now more than ever, an atmosphere of security and sympathy is essential to artistic development. Thus encouraged, the Emperor believes, with William Morris, that art has a great work to perform, particularly among those to whom fortune has denied wealth and leisure. As he well says, the Germans have risen to their present supremacy through their constancy to the great ideals which they have set before them, and it is the mission of art to elevate and comfort the poorer people by placing before them ideals of beauty, purity and love. It was William Morris's theory, founded on long experience, that a poor man whose æsthetic faculty had been awakened soon found a pleasure in the sunshine on the whitewashed walls of his little cottage, and the varying figures of his children, at play in the dark interior, that he would not exchange for the delights of a palace; and the most important, as well as the most neglected, principle of social science is, perhaps, that the key to the abolition of class distinctions, of the envy of the poor toward the rich, and the arrogance of the rich toward the poor, is to be found in art, which no class can monopolize, and which draws all, rich and poor, together by the purest and strongest sympathy. To be effective as a social force, however, the art must be good, that is, inspired with true feeling, and expressed simply and without affectation. If it is insincere or theatrical, it will fail to excite sympathy; and if its inspiration is bad, it will be an instrument of evil, instead of good. The Emperor said that "art which represents misery more hideous than it is sins against the people," and the point that the value of art lies in its power to keep before the world the ideals which it is the mission of civilization to cultivate should, particularly in these days of impressionism, of Sargent, Raffaelli and the other purveyors of soulless horrors, never be lost sight of.

FORESTRY Associations will do well to note a recent study, by Sir William Thomson, of the sources of oxygen in the earth's atmosphere. According to this, as reported in the newspapers, the original atmosphere of the earth consisted only of carbonic acid and nitrogen, and it was not until plants began to grow that oxygen, formed by the decomposition of carbonic acid in the leaves of the plant, by the influence of light, began to be mixed with the air. As time went on, and vegetation increased, the proportion of oxygen in the atmosphere increased also, until the mixture became fitted to support animal life, first in the lower grades, and, later, in a higher development. When man arrived, or was developed, the proportion of oxygen had reached its maximum, and he has, since then, expended a large portion of his energy, not only in consuming the oxygen that he found ready for him, but in cutting himself off from future supplies by destroying the vegetation which produces it. Since the discovery of coal, his resources for this sort of slow suicide have greatly increased, for every ton of coal, in burning, destroys about three tons of oxygen; and Professor Thomson observes that, ages before the exhaustion of the coal-supply, against which economists warn us, the oxygen supply will be so reduced that the air will be irrespirable. The obvious method of postponing this evil day is to add to the oxygen supply by increasing vegetation, and every one who makes a tree grow where one never grew before is not only helping to preserve the fertility and salubrity of the surrounding country, but is doing something to prolong the existence of the race on earth.

IT will interest contractors to learn from the New York *Evening Post* that "ruinous competition" has cut down the price of window-glass to such a point as to force "many dealers to conduct their business temporarily at a loss." To meet this sad condition of affairs, a "rise in price" is under consideration, to take effect early in 1902. We know of a good many contractors who would like to have the names and addresses of the dealers who sell window-glass "at a loss," and whose impression has been for a long time that the enormous prices asked for such glass were established by a monopoly which, under the shadow of a tariff-tax practically prohibitory, was making immense profits at their expense.

NOTES ON IRON AND STEEL CONSTRUCTION. — I.

ARCHITECTURE, in the completest and fullest sense of the day, embodies probably a more varied knowledge of the industrial arts and sciences than any other single profession. The man who follows architecture thoroughly and with distinction must necessarily not only be an economist, but must be, as well, an artist and a constructor. This last qualification, far from being the least, is of the utmost importance, an importance which, unfortunately, was not recognized a few years back, but which, from the very nature of things, must find its place to-day in the modern buildings of the large cities or towns.

How vastly more the term "constructor" means now than it did three or four decades ago; for to-day it is not sufficient to know somewhat of the rule-of-thumb methods of figuring the thickness of walls, the size of a joist or the construction of a king or queen post truss, having enough material in its construction to build a highway bridge and not enough strength in its connections to realize one-twentieth of the strength of its members. The constructor of modern buildings must be well versed in the strength of materials; he must know the mechanics of the beam or girder, and be well versed in the analysis of stresses in framed structures, as well as the shop-practice employed in their manufacture; he must, too, know all about the stability of arches and retaining-walls, together with the processes employed in deep excavation through plastic and unstable soils, and the construction of heavy foundations upon such soils, when required to support a great superimposed load.

It is the purpose of these articles, however, to deal entirely with that modern innovation, "steel-construction," and with the end in view of giving reliable and working data upon the subject succinctly and successively treated, the following is presented: —

The size of the beams and the sections of the columns, together with the dimensions of the members making up any structure framed and assembled, composing the framework of a modern building, are based upon data which must be assumed. The designer, in working from such uncertain data, can at best produce a building only approximately economical in its construction. The two uncertain factors making up the original assumption, and which fix the dimensions of the structural members in any building, are the dead and the live loads. The dead load is considered to include the weight of everything entering into the construction of the building, while the live load may safely be said to include all loads and forces external and independent of the building, and when classified in this manner embraces the wind load, either in its horizontal action against the side of a building, or in its normal action upon a roof, and it may also include under its heading the snow-load. When the live load is especially referred to in the design of the floor-construction, it is considered as representing the weight of people, merchandise, furniture, fixtures and machinery.

In calculating the dead load in a structure the design of the construction must first be decided upon, and since accuracy in this respect is impossible on account of the fact that the sizes of the elements are as yet undetermined, the dead load should always be checked carefully after the plans and sections of the building are well under way, and if the beams, columns, or trusses are found to be light, the rolled sections composing them should be increased in thickness until adequate cross-sections have been obtained. Correct assumptions and accuracy in the determination of the dead load are of the utmost importance, for the design and successful proportioning of the foundation footings depend mainly upon the data obtained from these calculations.

While the materials entering into the construction of the modern building are many, the architectural-engineer need only bear in mind the most important, more especially those which enter into wall, floor or roof construction. The weight of these materials should be ascertained carefully and not too much dependence placed upon data more or less general in its character. The following weights of the principal materials used in building-construction given in pounds per unit of surface or volume, depending upon which is the most useful in the calculations, have been compiled from reliable sources and are generally accepted as correct by practising engineers: —

WEIGHT OF COMMERCIAL STRUCTURAL TIMBER IN POUNDS PER BOARD FOOT.

Pine (southern yellow long-leaf)	3¼
Pine (white)	2
Pine (Oregon)	2¾
Spruce	2½
Hemlock	2
Maple	4
Chestnut	3½
Oak (live)	4¼
Oak (white)	4

WEIGHT OF METALS USED IN BUILDING-CONSTRUCTION.

	Pounds per cubic inch.	Pounds per cubic foot.
Structural steel	.283	490
Cast-iron	.260	450
Wrought-iron	.277	480
Copper (cast)	.319	552
Lead (commercial cast)	.412	712
Zinc	.253	438
Brass	.302	523
Bronze	.319	552

WEIGHTS OF MASONRY MATERIALS IN POUNDS PER CUBIC FOOT.

Asphalt, pavement composition	130
Bluestone	160
Brick, best pressed	135 to 150
Brick, common hard	110 " 125
Brickwork, pressed-brick	112 " 140
Brickwork, ordinary	110 " 112
Cement, Louisville	50
Cement, Portland	80 to 100
Cement, Rosendale	56 " 60
Clay, dry, loose	63
Concrete	120 to 140
Earth, dry, loose	72 " 80
Earth, dry, moderately rammed	90 " 100
Feldspar	166
Gneiss, common	168
Gneiss, hornblendic	175
Granite	170
Gravel	117 to 125
Hornblende, black	200 " 220
Lime, quick	95
Lime, quick, loose	53 to 59
Limestone	170
Loam, soft	110
Marble	164
Masonry, granite or limestone	165
Masonry, granite or limestone, rubble	154
Masonry, granite or limestone, dry rubble	138
Masonry, granite or limestone, rough mortar rubble	150
Masonry, granite or limestone, rough dry rubble	125
Masonry, sandstone	145
Pitch	75
Plaster-of-Paris	142
Quartz, common	165
Sand, pure quartz, dry, loose	90 to 160
Sand, perfectly wet	118 " 129
Sandstone, building dry	144 " 151
Shale, red or black	162
Slate	160 to 180
Soapstone, or steolite	170
Terra-cotta	110
Terra-cotta, masonry work	112
Tile	110 to 120
Traprock, quarried and piled	107
Traprock, compact	187

WEIGHT OF ROOF AND CEILING COVERINGS IN POUNDS PER SQUARE FOOT.

Corrugated-iron, No. 26 to No. 18, no sheathing	1 to 3
Corrugated-iron, No. 26 to No. 18, with 1″ hemlock-sheathing	3 " 5
Felt and asphalt, without sheathing	2
Felt and asphalt, with 1″ hemlock-sheathing	4
Felt and gravel, without sheathing	8 to 10
Felt and gravel, with 1″ hemlock-sheathing	10 " 12
Slate on laths, $\frac{3}{16}$″ to $\frac{1}{4}$″	7½ " 11½
Slate on sheathing $\frac{3}{16}$″ to $\frac{1}{4}$″	9 " 11
Copper, without sheathing	1 " 1½
Tinplate	1 " 1½
Shingles with laths	2¼
Skylight, glass $\frac{3}{16}$″ to $\frac{1}{2}$″, including frame	4 to 10
Lath and plaster ceiling	8 " 10
Tile, flat	12 " 15
Tile, corrugated	8 " 10
Tile on 3″ fireproof blocks	30 " 35

In making the necessary calculation for the dead load to be combined with the live, and to be used in determining the sizes of beams and columns, the general design of the floor-construction must be thoroughly studied and decided definitely. It is then a simple matter to make scale-drawings of the several sections of floor-construction between beams and from these calculate the weight of the construction per lineal foot of beam or per square foot of floor-area. It is always well in determining the unit dead load on a floor to disregard the usual tables

giving the weight of the different systems of flooring, and to make one's own calculations for each particular case in hand. By using actual weight and accurate calculations in each specific case, data regarding the requirements of the beams and girders entering into the floor-construction may often be determined that will lead to the adoption of considerably lighter beams and girders, and hence a material saving in cost will be instituted. In the preliminary consideration of a building the time cannot always be spared in order to take up the thorough study of these details, and therefore it is necessary to have at our command data which will give approximately the weight of such floor-constructions as are in everyday use. The following tables are as nearly correct as such generalizing under the several items will admit: —

WEIGHT OF USUAL FLOOR-CONSTRUCTIONS IN POUNDS PER SQUARE FOOT.

Ordinary joist, wood floor, plaster ceiling	20
Heavy wooden girders, 3″ rough floor, 1″ finished floor	18
Brick arch, 4″ thick, concrete filling, 1″ finished floor: —	
8″ I-beam	75
9″ I-beam	80
10″ I-beam	90
12″ I-beam	100
15″ I-beam	120
Hollow brick flat arch, ordinary type: —	
8″ I-beam	70
9″ I-beam	75
10″ I-beam	80
12″ I-beam	90

The uncertain factor in figuring the dead load is the weight of the floor-beams, the sizes of which have as yet not been determined. Any rule which will give this information, even though it is only approximate, and far from accurate, is of value. There has been such a rule evolved, based on the condition that beams are designed upon the same limitations that are usually employed, and which will be given later. This rule applies to steel beams only and is as follows: —

$$W = \frac{L \times S^2}{1{,}000 \times d}$$

In which W equals the weight of the floor-beams in pounds per square foot of floor-area; L equals the combined live and dead loads in pounds per square foot of floor-area; S equals the span of the beam in feet, plus the length of the beam-bearing; 1,000 a constant, and d the depth of the beam in inches.

In order that the above may be clear, the following example may be interesting: —

Example. — The span of a beam supporting a floor-load of 150 pounds is 20 feet; what will be the weight of the beams per square foot of floor-area, provided 15-inch beams are used?

Solution. — From the problem, the values of the symbols in the formula are as follows: L 150; $S^2 = (20 + 1.5)^2$ or 462.25, 9 inches at either end being taken for the bearing of the beam at either end; $d =$ 15 inches. Then substituting in the formula we have

$$W = \frac{150 \times 462.25}{1{,}000 \times 15} = 4.62$$

While the dead load is at first only based on a series of assumptions, it is eventually accurately determined; not so, however, with the live load, which is probably never within 25 per cent of the load assumed. This load is so variable in amount that only an assumed load, which must be the maximum, can be taken. Since this maximum load is nearly always considerably in excess of the actual load, it is necessary to include in the structural members of a building considerably more material than is ordinarily required. It is, therefore, economy to keep the maximum live-load as low as possible after a careful analysis of the conditions obtaining in the particular building has been made. All original investigation along this line is therefore extremely valuable, and authentic data regarding the live-loads that obtain in existing buildings should be carefully scrutinized.

Many buildings at present erected are designed for excessive live loads, but as it is usually necessary to conform to certain building-laws, which are extremely general in their application and consequently inadequate, the designer cannot figure on the light loads which he knows will amply meet the requirements. The modern office-building, for instance, is hardly likely to fill any other function in the business world than it does, and statistics show that no office contains a greater load than 40 pounds per unit of floor-space, and that the average load is not one-half this amount; nevertheless, the limitations imposed by the several city ordinances are far in excess of this amount. It is well, undoubtedly, to be on the side of safety, but where heavy live loads are impossible, owing to the nature of the structure and means of intercommunication, it would seem that greater latitude should be given.

In buildings for public assembly there is hardly a necessity for a load of more than 80 pounds per square foot, which is the average weight of a densely-packed crowd of people, though in the case of a panic an unusual condition of loading may result, and a load of 120 pounds or more be attained. It would seem reasonable, however, to adopt the light load in figuring, especially in buildings where there are fixed seats, pews or benches, for on such a floor-area even the load of 80 pounds will not obtain except in the aisles. The necessity for a larger live-load than 40 pounds per square foot of floor-surface does not exist in dwelling-houses, except for the fact that on occasion they are subject to the same condition as an assembly hall or room; and then, too, there is no class of building situated in the midst of a city that more quickly outlives its original use than a dwelling-house; for these reasons a live load of 70 pounds should usually be considered. Such a live load is, however, not necessary in designing a country house, at least in all rooms and halls not used for assemblies, and 40 pounds will be adequate except for those wherein 70 pounds would be a better assumption and one sufficiently safe.

All other buildings, such as factories, warehouses, machine-shops and printing-plants, are designed for specific purposes; and they should be carefully designed to fulfil the conditions of loading which are reasonably likely to occur under actual working conditions. In fact, for this class of buildings it is entirely impossible to fix any general rules as to the amount of the live load to assume. One single floor of a plant may be subjected to twice the live load that would obtain on the other floors, and consequently should be proportioned for the additional burden. Then again, the vibration of moving machinery is an important factor which is often overlooked in the design of floor-construction; it is, nevertheless, a factor that should never be neglected in the consideration. The floors of printing-plants are especially liable to a vibratory movement, owing to the nature of the machinery, and in designing the floors of buildings erected for this purpose too much care cannot be exercised in order to secure stiff girders and beams, and broad bearings and rigid connections.

The live loads usually assumed for buildings built for many purposes and requirements are as follows: —

LIVE LOAD IN POUNDS PER SQUARE FOOT USUALLY ASSUMED IN BUILDINGS OF DIFFERENT CLASSES.

Country and suburban houses: —	
Sleeping-rooms, studies, etc	40
Halls, ball-rooms, dining-rooms, etc	70 to 80
City houses	70 " 80
Churches, theatres	80 " 120
Drill-halls, dancing-halls, etc	120 " 150
Manufacturing-plants	120 " 400
Machine-shops	150 " 450
Warehouses	150 " 500

When a careful analysis of the dead and live loads is not made in the preliminary study or the hasty design of a building, recourse is had to data which cover both, and the following table can be considered as conservative and accurate as such a general recapitulation can be: —

ENTIRE LOAD IN POUNDS PER SQUARE FOOT USUALLY ASSUMED IN THE DESIGN OF FLOORS FOR DIFFERENT PURPOSES.

Plank covering, lightest construction	100
Brick arches	150
Light-warehouse floors	200
Places of public assembly	200
Heavy warehouses	300 to 600
Shop-floors for light machinery	250
Shop-floors for heavy machinery	300 to 500

In the design of a modern steel structure all of the members must be proportioned for the full live load that they will be required to sustain; it is, however, not considered necessary practice or economical construction to proportion all the members in the structure for the maximum live load that the utmost possibilities of loading may necessitate. The floor-beams must always be proportioned for the full live load, for some of them are more than likely at one time or another to be fully loaded. That all of the floor-beams in a system of flooring depending

for its support upon a principal girder are likely to be loaded with the full live load at any particular time is highly improbable, and, consequently, good practice would seem to dictate that only 90, or possibly as low as 80, per cent of the maximum live load may be figured as coming upon the principal girders. The high office-buildings of modern construction contain many floors, supported by tiers upon tiers of columns, and as the sectional supporting-area required in any one floor must be carried to the foundation-footing through all of the intervening columns, it can readily be seen how important it is, for economical reasons, that the loads upon these principal supports should be reduced to the lowest possible amounts consistent with safety.

That all the floors of an office-building should be called upon to sustain the maximum live load all at the same time is not likely, even if with the present means of intercommunication and usual transaction of business it were possible, and so a certain reasonable reduction in the percentage of all the live load above that a tier of columns may be called upon to carry can certainly be made. This percentage of reduction is entirely a matter that lies within the individual designer's province in the construction of the particular building in hand, and no data or rules general in application will be of much practical value. In this connection the above data giving the amount of the live load and the percentage of increase of the same load from the floor above, of a thirteen-story building of the skeleton-construction type erected in Chicago, may be interesting as a sample of how much economy may be effected by the adoption of such assumptions : —

	Live load per square foot of floor-area.	Live load on columns from floors above.	Total live load on columns.
Roof	40		
Thirteenth floor	50	40	40
Twelfth floor	50	45	85
Eleventh floor	50	41	126
Tenth floor	50	35	161
Ninth floor	50	31	192
Eighth floor	50	25	217
Seventh floor	50	21	238
Sixth floor	50	15	253
Fifth floor	50	11	264
Fourth floor	50	5	269
Third floor	50	1	270
Second floor	50		270
First floor	125		270
Basement		50	320

M. M. Sloan.

[To be continued.]

THE CATHEDRALS ONE WILL NEVER SEE.

TWENTY years ago, after having chatted awhile about grotesque and symbolic sculpture, in that immense workshop in the Rue Condorcet, Viollet-le-Duc showed me some of his admirable drawings: bird's-eye views drawn with the hand of an expert and delicately tinted, studies and details of the most astounding precision; then, halting a few seconds before a superb drawing of the Cathedral of Paris, he cried, "Just think, there is not a single cathedral, not one, understand you, which has been finished as it was intended to be!"

This exclamation has very often occurred to my mind, and I ask myself if it would not be interesting to give in a few sketches, intentionally neglecting the details in order to simplify and aggrandize the appearance of the *ensemble*, I ask myself if it would not be amusing, perhaps even interesting, if not instructive, to give a sketchy presentation of the cathedrals which will never be seen!

And first, it must be said, cathedrals built as one operation are rare, and ought to be. It would, in fact, be necessary for this that the work should be carried on with incredible rapidity and with boundless resources, at those epochs where each style of architecture frankly had the better of earlier styles, where each century built according to that formula of art which was familiar to it.

I can better make understood by the detail of some church — the façade of the Cathedral at Rouen, for instance — this principle of the superposition of styles which prevailed up to the end of the eighteenth century. And in this connection, I must remark that in all the drawings [see Illustrations] the tinted surfaces show the edifice as it exists, while the additions, the portions projected or not executed, are merely indicated in line.

Now, regarding the tower of Saint Romain, a single glance will show through what phases it has, or might have, passed. In the first place, the primitive construction is of the twelfth or thirteenth century, showing a charming little staircase tourelle which most happily breaks in on the symmetry of one of the faces of the tower. Then, the upper platform, destroyed by a fire, was levelled, and they busied themselves with completing the tower. According to the plans of the early architect, the tower should have been crowned with a grand pyramid, flanked by four smaller pyramidions, in the style of that which finishes off the staircase turret. This cannot be doubted. But years passed, resources were lacking, and so we come to the fifteenth century. Then, the architect, Guillaume Pontifz, no longer hesitates; he crowns the ancient stories with a new one, beflowered, ornamented with balustrades, pinnacles, arcades and statues the richness of whose details frankly breaks with the masculine simplicity of the portions already built. And even then it is not done. It must be finished, it must be covered, in a word. Suggestions are asked for from different artists; for a time there is an idea of finishing the tower as a campanile. Finally, after long discussion, they adopt the form of a pavilion roofed in iron which is decorated with carvings and appliqué-work in metal. But, I suppose this roof to be destroyed at the commencement of the seventeenth or even eighteenth century. Never, never, would the architects of those times have reëstablished it, and we might have seen the tower of Saint Romain finished, as the last sketch shows, by an openwork campanile, in several stories retreating one above the other.

I give this as an example of the superposition of styles — especially in the matter of spires and towers — which so completely modifies the aspect of the *ensemble* of cathedrals, of which fact, moreover, there are numerous proofs, as at Chartres, Strasbourg, and so on.

Two cathedrals, particularly, which have escaped this superposition of styles must, nevertheless, be mentioned. For the completion of one — Cologne — architects of methodical mind, wise and conscientious, set themselves a task full of self-abnegation, since it continued purely and simply to completion an unfinished edifice. They worked according to the painstaking principles of the stone-mason who measures the ancient profiles, and cuts them with most scrupulous care from new blocks of white stone which can be substituted for the blocks of stone blackened by time, and which are then slipped into place as into a cell, without leaving a millimetre's play.

The choir of Cologne Cathedral, begun in 1248, was finished in 1322. The work was interrupted in the sixteenth century. Then, in the last century, from 1817 to 1880, work was carried on steadily, and to-day the Cathedral of Cologne, finished only a few years ago, Gothic from base to summit, rears towards the sky its two immense towers of openwork stone 156 metres high. But this veritable *tour de force* of unity of style, so energetically carried out, was possible only in our epoch, after the development of the science of archæology — a development which is one of the characteristics of the nineteenth century.

Earlier than this, such an achievement was impossible, and another cathedral — the Cathedral of Orleans — gives us an indisputable proof of this. In 1562, the inhabitants of Orleans saw their cathedral devastated; they wished to rebuild it. Up to this point, well enough. But, by an oddity not wholly free from obstinacy, instead of asking of the architects of the seventeenth and eighteenth centuries plans for a *new* structure, they demanded of these architects that, abandoning the formulas which were familiar to them, they should *reconstruct* the cathedral exactly, that is to say, should rear a Gothic structure. Now, at this time, not only the taste for Gothic building was not the fashion, but no one even knew how to draw a Gothic edifice with exactitude. This may appear extraordinary, but it is a fact. Let any one consult a number of the finest plates engraved in the last century, and he will see that the characteristic line of Gothic structure is wholly unknown to the most skilful draughtsmen, who always had a tendency to apply the formula of the pilaster and entablature of their own epoch to the structures of earlier centuries which they believed they were portraying.

So it is that the Cathedral of Orleans is the most ridiculous interpretation of Gothic which it is possible to dream of. The robust buttresses have been transformed into pilasters with columns at the angle; the pointed arches — and what arches! — rest on entablatures. The disproportioned arcades, the openwork cresting, like jig-sawed woodwork, and the tympana with their childish rose-windows make everybody laugh.

Would it not have been better, a hundred times better, as Victor Hugo has so well said, that "the great structures, like great mountains, should be the work of ages; that each wave of time should superpose its own alluvion, that each race should add its layer upon the monument, that each individual should add his own stone?"

Thus much said, a comparison of certain façades will show us what might be the change of aspect of some cathedrals if only we could see them finished. The Cathedral of Laon is one of the most beautiful buildings of the thirteenth century, and ought to have as many spires and towers as Rouen; the drawing of the façade indicates with clearness that the towers, with their openwork buttresses and silhouettes of animals detaching themselves against the sky in so decorative a manner, are not yet finished. A poverty-stricken balustrade now finishes the platform, while two pyramids with spirelets crowning the angle-buttresses — now decorated with oxen of huge dimensions — should have crowned with absolute symmetry this façade of so masculine a simplicity.

The Cathedral of Amiens, also, does not appear as it should. The richness of its façade is admirable. Less sumptuous than that at Rheims, but with a beauty of line perhaps at the same time more robust and more elegant, the façade should have for complement two towers, which, as we now perceive, must be dissimilar. To-day, the platforms above the balustrades are protected by little roofs, and conical or pyramidal roofs decorated with lead crown the staircase turrets. But if we suppose these two towers finished — either in the

fourteenth or fifteenth centuries — grafting upon the existing bases the confectionery-work carving of new stories, rendered still more delicate by contrast with the robust buttresses that flank the towers, these would have given to the Cathedral of Amiens an aspect of incomparable richness.

And no more is the Cathedral at Strasbourg finished, and the tower which is lacking was, nevertheless, very necessary. Doubtless, we have become habituated to the present silhouette. The "Münster," with its spiral staircase, 142 metres high, losing itself in the morning mist, gives to the façade a very characteristic silhouette; it is, nevertheless, true that there lacks a pendant to this fourteenth-century tower. This pendant, most likely to be built in the fifteenth and sixteenth centuries, would, in all probability, have been more elevated than the "Münster," for it is an almost constant law that each century always seeks to excel its predecessor, and, probably, this new spire would far have surpassed the spires of Cologne. But, unfortunately, it never did exist and never will exist!

If now we look at cathedrals in profile, those especially which ought to have several spires or towers, we shall be impressed with the change in silhouette of these great edifices. First I will speak of the superb drawings of Viollet-le-Duc. This eminent architect, in fact, made a drawing of the façade of the Cathedral of Paris and a bird's-eye view of the Cathedral at Rheims which give a marvellously exact idea of what the aspect of these two cathedrals should have been, but which we shall never see.

"If the façade of Notre Dame of Paris is very beautiful as it exists to-day," he often said, "we must, nevertheless, remember that everything had been so well prepared for the stone spires that we cannot but regret their absence. In the construction of the towers there is a force and strength which is not justifiable, since they carry nothing. Now, if these piers, so skilfully planted, if these grand bays terminated with masculine archivolts, if this structure, somewhat heavy for its crowning, could only be finished with spires, how elegant all would appear!"

All this is perfectly true, but it does not prevent, if on one fine day we should see scaffoldings set up and work begun on the building of the stone spires, that there should break out such a riot among certain alleged amateurs and archæologists that the audacious architect who should undertake such a work would be obliged to seek safety in quick flight. The public doesn't like to be disturbed in its habits. We saw this a few years ago when Falguière set up on the Arc de Triomphe his full-sized model, which set the grand silhouette of a quadriga against the light of a setting sun. The composition was pretty enough; some of the figures at the angles should have been altered — as was agreed by the sculptor himself. The model was left there to rot away slowly and make itself unpleasant, and, finally, to fall to pieces: so the Arc de Triomphe remains as it was, without crown, because the public was not accustomed to see it otherwise and, not liking to change its habits, disdainfully turned its back upon the artist's project.

For the real finishing of the Cathedral of Paris, it would be the same, and yet, according to Viollet-le-Duc's idea, the Cathedral of Paris — thirteenth-century work — ought to have had its façade dominated by pyramids equally of the thirteenth century. And yet it might very well have had its façade finished with towers of the fifteenth or sixteenth century, or even by campaniles with domes and colonnettes of the seventeenth or eighteenth century, and would not have been any more ugly for that. Picturesque cathedrals are not distasteful to artists.

From this point-of-view, it has been said a hundred times with perfect truth that the Cathedral of Rouen is one of the most picturesque cathedrals which one can dream of. The exterior of the choir is of the twelfth century, the nave and choir of the thirteenth, the gables of the transepts of the fourteenth; the sixteenth-century façade, set above the thirteenth-century façade, is flanked by two towers, one of the twelfth, the other of the fifteenth, and yet the cathedral is not finished. Far from it. The real Cathedral of Rouen, the one which will never be seen, ought to have seven towers. Seven towers? some will ask, that is wholly unlikely! No, we shall see shortly that Rouen should have had eight towers and Chartres nine. Nothing is easier than, not only to justify these towers, but to see how they would have looked when finished as they should have been. At the side of the façade, the tower Saint-Romain, which I have already used as an explanatory type, ought to have appeared with a campanile of the sixteenth or seventeenth century, replacing the slate-covered roof we have spoken of. As to the "Butter Tower," it lacks a stone pyramid of openwork with crockets on the arrises. The portals of the two transepts show the lower stories of four pyramids which should flank the lateral doorways. As to the central tower, the stone base of 1353, burned and repaired in 1514, was, in 1544, surmounted by a *flèche* designed by Robert Becquet, in wood covered with lead. This was burned by lightning in 1822. Later, this Renaissance *flèche* was replaced by one in cast-iron. In the drawing, I suppose that the work of Robert Becquet still appears intact, and I believe that when we think of the effect produced over the countryside by the towers of Tournai, which still exist, we can only regret the incompleteness of our cathedrals, whose picturesque silhouettes would have been so attractive and grandiose.

The Cathedral of Rheims would also have been very imposing with its eight spires, and it is quite impossible to pretend that it is much better to-day than if it had been so finished. The western towers, 80 metres in height, would have measured 120 if the spires had been built. The finish of its angle-turrets is more than suggested, only the pyramidion and the gables are wanting. The Cathedral of Rheims, seen in profile, appears still more unfinished than the Cathedral of Paris. If now we add the four transept spires, the central spire and that little *flèche* which exists above the choir, the angle-tower 18 metres in height whose base is formed by caryatides in an attitude of torture, one would be compelled to agree that, amongst the celebrated cathedrals, Rheims is one of those which would have gained most if seen completed.

Apropos, nevertheless, of restored spires or towers, and particularly of central spires, it must be said that in illustrations of this kind it is allowable to hesitate, not as to the proportions — for they are imposed by the relations of the *ensemble* — but as to the mode of construction. The original architects, lacking means, have, as is said, sometimes hesitated before the danger of too greatly overloading the isolated piers of the transepts, and they had terrible experience of this at Beauvais. Often the central spires were not built, but were replaced by a *flèche* of woodwork covered with lead, which, in spite of its really considerable weight, was far less of a load upon the lower portions of the structure than stonework would have been. But it should be added that if these same architects had had the time and the necessary resources to finish their buildings — where the original plan showed transept towers — these spire-terminated masses, buttressing the flying-butresses of isolated piers, would have rendered central stone spires far less dangerous. The Gothic building being *par excellence* a methodical construction, in perfect equilibrium, it was necessary to proceed in orderly manner and erect one after the other, according to the requirements of statics, those masses which were at once necessary and decorative.

As to the Cathedral of Chartres, which to-day we see with only two towers — and it is true that these towers are very marvels, and certainly give the countryside a superb silhouette, — what would it have been if nine towers had been built? The height of the old tower (106 metres) is exceeded by the new tower (115 metres); the four transept towers, and especially the two towers rising from the beginning of the choir, would have had less noble proportions, but the central spire would certainly have exceeded the "Münster" at Strasbourg, even if not the spires of Cologne.

But the marvel of marvels, from the picturesque point-of-view — and that is one which perhaps is least negligible — is the Cathedral of Beauvais. Not that it would ever have had against the sky a forest of spires, or towers, but because of its mere dimension, its fantastic proportions, this cathedral, if finished, would have been simply the queen of all cathedrals. Every one knows that the choir still exists, and this choir is higher than that of Cologne. This choir, of the thirteenth century, measures 68 metres in height, and the two transepts were built between 1500 and 1537.

I have placed side by side, at the same scale, the Beauvais choir and the present façade of the Cathedral of Paris. At a glance, we can perceive the difference in size. The two towers of Notre Dame de Paris could be sheltered under the roof of Beauvais, as if they were two simple soldiers sheltering under sentry-boxes. What prodigious effect would have had such a cathedral finished according to these dimensions, one hardly dares to dream! The central spire, 153 metres high, higher than the towers of Cologne, did exist — this appears hardly believable — but not for a long time, it is true. This spire, due to Jean Vast, the lantern of which was visible from the interior of the cathedral, crumbled away in 1573.

Surely the Cathedral of Beauvais would have been finished in the style of the purest Renaissance, since the transepts date from 1537; surely the western towers would have belonged to the seventeenth century, if not the eighteenth, one at the least. The Cathedral of Beauvais would have been a work of centuries; it would have been "like a mountain, in the true sense of the word, upon which each had reared according to his taste the construction which pleased him." — *Jules Adeline in Le Monde Moderne.*

BOOKS AND PAPERS

WE will begin our criticism of Mr. Gotch's book[1] with the only unfavorable observation which we shall have to make in regard to it. This is, that the appearance of the work could have been brought more into agreement with its merits by a little greater care in the management of the illustrations. From Mr. Gotch we expected, in his new book, something like his magnificent work on the Architecture of the Renaissance in England, only, of course, on a smaller scale; and, while the material is as excellent and abundant as any one could desire, it is a disappointment to see it illustrated by photographic full-page plates printed apparently at random, in all shades of color from dead black to warm sepia, mingled with half-tone cuts, scale-drawings and sketches, the last of which, in some cases, leave a great deal to be desired. It is, undoubtedly, necessary to use both drawings and photographic illustrations to explain the subject, and, in the earlier work, this was done with good judgment and excellent effect; but in the present book we find repeatedly collotype plates in brown and half-tones in black

[1] "*Early Renaissance Architectecture in England.*" A Historical and Descriptive Account of the Tudor, Elizabethan and Jacobean Periods, 1500-1625. For the Use of Students and Others. By J. Alfred Gotch, F. S. A. With 317 Illustrations. New York: Imported by Charles Scribner's Sons. Price $9.

.acing each other on opposite pages, and half-tones and pen-and-ink sketches on the same page; while, of the latter, one or two, as, for instance, that representing the staircase at Lyveden, on page 186, might almost be called discreditable. We are often told that sketching is in disrepute among English architects just now, and that we must not expect much from people who have so many other things on their hands; but there are still draughtsmen in England who can make very pretty architectural sketches, and the era of Nesfield and Norman Shaw is not so remote that one need despair of finding talent enough yet surviving to make tolerable sketches for a book which must inevitably be compared with the work of Nash and Richardson and Shaw.

Apart from this criticism we have nothing but praise for the book. Although the illustrations are necessarily small, there are a great many of them, and they show clearly the development of the Early Renaissance in England, in plan and detail; while they are accompanied with an extremely interesting and valuable text, tracing the history of the style from its timid beginnings, under Henry the Eighth, to its full assertion in the works of John Thorpe and Inigo Jones, and giving, as only an architect's writing could, exact ideas of the origin and growth of the peculiar forms of ceiling decoration, panelling, metalwork, mantels and staircases which, even more than exterior pilasters and curved gables, form the essential characteristics of the style. The lover of architectural history will read the book with very great pleasure, while the practising architect will find in it invaluable suggestions for reviving, under such modifications as the conditions of modern life may require, the spirit of a style which has always had a singular charm for the profession and the public.

It might be supposed that everything that could be said about perspective had been already said; but, to the real lover of the art of perspective drawing and sketching, there is perennial interest in learning what each new author has to bring forward on the subject; and, if Mr. Longfellow's book[1] has nothing new in the text, it would still be interesting from the skilful use made of photographs to illustrate the principles which it gives. It may be observed that the perspective of photographs is generally very false. Not only does the photographic lens give us rather the picture of a small model of the subject, seen from a distance of a few inches, than a representation of it from a point so far distant as to reduce it to the given size, but the correction for spherical aberration often magnifies the objects at the sides of the picture very materially in proportion to those at the centre, thus introducing new distortions. Mr. Longfellow, however, uses his photographs with excellent judgment, employing sometimes pictures taken with a short-focus lens, and sometimes those taken with a lens of long focus, in which the distortion is far less, to illustrate the points under discussion. With the help of these, and of a multitude of outline sketches, the beauty and cleverness of which can be fully appreciated only by the expert architectural draughtsman, he discusses in a most interesting manner, and at greater length than any other writer on the subject, so far as we know, what may be called the technique of perspective drawing: that is, the great mass of empirical rules, the result of observation, guided by good taste, with which the thoroughly accomplished draughtsman must supplement his knowledge of the mathematical science of perspective. At the very outset, for example, the learner is made to find the vanishing-point of diagonals, and is shown, by various examples the uses to which skilled draughtsmen, and, as a rule, only skilled draughtsmen, apply this invaluable key to rapid perspective drawing. Next, the student is introduced to perspective scales, so that he may, from the first, avoid the ridiculous blunders which so often disfigure the work even of people who call themselves accomplished draughtsmen.

Having explained these simple points, — which, if understood by every one who attempts perspective drawing, would do away with those pictures of the interior of churches a mile and a half long, or thereabouts; of giants stalking through streets of Lilliputian houses, and of figures poised in air above the roof of the houses that they are supposed to inhabit, which adorn the walls of nearly every exhibition-hall, — the book takes up a systematic method, which it bases on the use of the perspective plan. This, it may be observed, is a very old-fashioned method; but it is so incomparably superior to the more modern ones in the facilities which it affords for unravelling difficulties, and giving rapid approximations, as well as in its superior neatness of handling, that it has been revived of late years, and is now in general use by the best draughtsmen. Taking this as a starting-point, the book gives us some valuable observations on the choice of the conjugate vanishing-points, and the proper use of parallel perspective, with that of vanishing-points of inclined lines, adding a variety of suggestions, which the professional draughtsman will find of great value, for making inaccessible vanishing-points available; and, later, we find several chapters, as new as they are interesting, devoted to labor-saving methods of drawing circles, arches and vaults, of almost every imaginable kind, intersecting and otherwise, in correct perspective.

A draughtsman who thoroughly understands the method of the perspective plan, with its applications and consequences, hardly needs to trouble himself about other systems; and Mr. Longfellow is, to our mind, judicious in dismissing with brief notice the much-vaunted theory of curvilinear perspective. The authors of books on perspective sometimes forget that draughtsmen and artists, who have to earn a living by making correct and pleasing drawings, have no time to spend in following mathematical reasoning from doubtful postulates. They need, what very few of them possess, a thorough knowledge of one good system, which should, however, be aided by the observations which Mr. Longfellow gives in greater profusion than any other writer that we know of, and with admirable judgment, on the most advantageous choice of horizon-lines and vanishing-points; the grouping of figures; the arrangement of the composition, and many other matters which affect the success of the picture to a degree which only experienced draughtsmen can appreciate.

[1] "*Applied Perspective*": for Architects and Painters. By William P. P. Longfellow. Boston and New York: Houghton, Mifflin & Co. 1901. Price, $3.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

NEW THEATRE, CORNER OF TREMONT ST. AND VAN RENSSELAER PL., BOSTON, MASS. MR. J. M. WOOD AND MR. J. G. HOWARD, ASSOCIATE ARCHITECTS, NEW YORK, N. Y.

SECTION OF SAME BUILDING.

CATHEDRALS THAT ONE WILL NEVER SEE: LAON; STRASBOURG; RHEIMS; AMIENS; CHARTRES; PARIS; BEAUVAIS.

For discussion of these subjects, which are copied from *Le Monde Moderne*, see article elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

CANCELLO DELLA VILLA MASSIMI, IN VIA MERULANA, ROME, ITALY.

[Additional illustrations in the International Edition.]

THE ATLANTIC BUILDING, WALL AND WILLIAM STS., NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.

DETAIL OF THE SAME.

DETAIL OF CENTRAL FOUNTAIN: VILLA LANTE, BAGNAIA, ITALY.

DRUMMOND CASTLE, FROM THE SOUTH.

DECIDUOUS CYPRESS: VILLA DORIA–PAMPHILI, ROME, ITALY.

GATEWAY: HAMPTON COURT PALACE; GATEWAY: SYON HOUSE, MIDDLESEX, ENG.

NOTES AND CLIPPINGS

Washington Allston. — It is remarkable that the name of the only eminent American painter who was born in South Carolina should have been omitted from the list of great American artists inscribed on the walls of the Fine-Arts building at the Charleston Exposition. The claims of Washington Allston to a place in the list are thus set forth in a letter written by Edward Octavius Flagg to the *Mail and Express* of New York. "If he were not mentioned as handling the brush equal to these, his compeers, there are other reasons why he should be enrolled on the immortal list. As a painter alone, while in Florence, he was styled the Titian of America. He was in this regard most highly appreciated in Europe, where his best pictures are to be found. He produced a portrait of Coleridge which his friend Wordsworth, echoing a common sentiment, pronounced a masterpiece. All of his choicer productions have long been deemed full of suggestiveness, classical merit and idealism which belong to a pure and exalted imagination. Aside from the painter, other considerations would seem to have weight in determining an honorable award on the part of his judges and room where it is denied. His humanity was displayed when, at a great sacrifice, he freed his slaves. His society was widely sought by those who would enjoy an entertaining and improving converse. He stood among the first as a scholar, poet and prose writer. Mrs. Jamison said that he was one of the three great men of America in her day. He was born in South Carolina, and had not ceased to shed lustre upon his native State from the time when he delivered the poem at his graduation from Harvard until the day of his death. Boston has honored him by placing at the entrance of her Art Museum his splendid conception of "Belshazzar's Feast," also by calling after him a gallery in the same, likewise a street and an adjacent town. [Not a town, but a railway-station neighborhood in the city. — Ed.] In the new art-gallery at Washington his name is inscribed in mosaic. The following is the list of painters referred to: Benjamin West, Gilbert Stuart, John S. Copley, Thomas Sully, George Inness, A. H. Wyant, Homer Martin, George

Fuller. Allston was certainly superior in rank to some of these. Another name that should have appeared is that of Frederic E. Church, who was altogether the greatest man in landscape whom America has yet produced.

THE VILLA BORGHESE. — The Villa Borghese and its famous gardens at Rome have been purchased by the Italian Government. The gardens will be united with the Pincio, and the Borghese villa will become another public museum. Payment will be distributed over ten years. In all probability the Government will sell the gardens to the municipality of Rome, but if this be impossible the land can be sold to private parties. The King is to erect a monument to his father, Humbert, in the Borghese Gardens, and the Government will establish on a portion of the land an agricultural college. The collection in the villa includes the Titian which a modern expert has identified as a scene between Aphrodite and Medea, the enchantress, famous under the title of "Sacred and Profane Love." There are also the "St. John the Baptist in the Desert," by Paolo Veronese, the famous "Danaë and the Rain of Gold," by Correggio, and the Raphael, painted in 1507 at Perugia, the celebrated "Deposition from the Cross." — *Boston Herald.*

LONDON'S DEADLY WATER-SUPPLY. — The life of a Londoner is worth ten to fifteen years' less purchase than that of the average provincial. This fact is due to many causes, but the chief among them is the quality of the water. London water is "hard." That is to say, it contains a large quantity of the carbonate and the phosphate of calcium. The tea-kettle proves this. When a Londoner examines his tea-kettle he must be horrified to think what the condition of his stomach must be. But the tea-kettle reveals only a fraction of the state of affairs. When water is boiled the carbonic acid which held part of the calcium in a state of solution (and therefore invisible) is driven off and the solid calcium falls to the bottom. But boiling has no effect on the phosphates. They still remain in solution, and are swallowed in our tea and coffee. Now, barring fatal disease, the chief cause of decay and death is calcification of the blood vessels. This prevents proper circulation of the blood and produces apoplexy. In London water we swallow enough stony matter to shorten our lives ten or a dozen years. Drinkers of soft water escape this life-destroyer, and hence most provincial people live longer than Londoners. The moral is that every Londoner ought to welcome the day when fresh sources of supply will be available. The Welsh water, which the London County Council hope some day to obtain, has very little calcium salts, and it should prolong the life of its consumers by many years. — *London Mail.*

TRANSMURAL VENTILATION. — In the year 1878 Dr. Flugge proved that air will go through the walls of a closed room, at a rate depending mainly on difference of temperature between the inside and the outside — the latter being the lower. With walls of ordinary thickness he found that about one-fourteenth of the air in the room would be changed per degree Centigrade per hour. In other words, if the outer were 14 degrees Centigrade colder than the inner, the air of the room would be completely changed in an hour by transpiration through the walls. M. H. Wolpert has re-examined this subject, and he finds that in a chamber of 60 cubic yards capacity, having walls of masonry covered with paper, the air will be changed at the rate of one-fortieth of its volume per degree Centigrade per hour. When the paper on the walls contained oil-varnish decidedly less air permeated, while without paper at all much more went through. It is desirable, therefore, that the exterior of houses should be clean, and a heavy rain is a blessing in this respect. Also it follows that the greater the difference between inside and outside warmth the more copious this spontaneous ventilation. Pettenkofer found that when materials like slag and glass were used, through which air could not pass, the cements employed were, as a rule, highly permeable. — *London Telegraph.*

BOGUS ANTIQUE TAPESTRIES. — The two curiosity dealers who were arrested for doctoring new tapestry and selling it for old, have just been condemned to six months' imprisonment and 1,000 francs fine each. The principal culprit was, it appears, Charlanes, who had failed as an upholsterer, and who, being hard up, had the brilliant idea of buying new Aubusson tapestry, doctoring it, and selling it as old. He had two accomplices, Deschamps, who has made himself scarce, and Sauvageot, who shared his condemnation, and the trio used to sew on to the modern tapestries antique linings, stain parts of them with walnut-juice, rub them with wet earth, powdered pumice-stone, soft-soap, and other products, scent them with camphor or "naphthaline," and all this with "intent to deceive." Charlanes took the treasures, once doctored, into the provinces and sold them to unsuspecting persons as the possessions of aristocratic families who had been obliged to dispose of them. One unfortunate lady who had bought a set of panels for 13,000 francs showed them afterwards to an expert, and then the murder was out. To people interested in tapestry and having a knowledge of it the whole affair is surprising, for hand-made and machine-made tapestry are so utterly different. — *London Globe.*

BOLOGNA'S LEANING-TOWER IN DANGER. — Bologna has been having a sensation in the rumor that its great leaning-tower, the pride of the city, is weakening, and may fall. This has caused so large an influx of visitors that it is said the hotel-keepers may not be wholly guiltless in regard to the rumor. The city has two of these square towers, the Asinelli, which is 315 feet high, and was erected in 1109, and its rival, the Garisenda, which was built one year later, and was originally much higher, and is rendered peculiar by its decided inclination to one side. It is now only 153 feet high, the width of one side is 23 feet, the walls at the base are 6 feet 6 inches thick, while higher up they are 4 feet 9 inches. Its origin is somewhat obscure, but it was certainly intended to outdo the Asinelli, and both were for retreat in troublous times. Some say the original intention was to make it lean, but others contend that either the ground has settled or there was a defect in the engineering. This unique relic was so little thought of by one of its later possessors that it was sold in 1266 for 220 lire, something less than $44. — *N. Y. Tribune.*

NEW YORK'S FIVE TUNNELS IN POSSE. — These are some of the more important features in the Pennsylvania Long Island railroad plan for running direct to New York City by tunnels: There are to be five tubes, three under the East River and two under the North River, all joining at a central station in a space at Seventh and Tenth Avenues, Thirty-first and Thirty-third Streets. The station is to be one of the largest ever constructed, measuring 1,500 feet in length by 520 feet in width. Leading to it will be 15 miles of tunnels. The tunnels will have an inside diameter of 18 feet 6 inches. There will be a single track in each. There will be a total of 25 tracks in use at the central station, which is to be three-decked. Electric-motors will be employed in hauling trains through the tunnels. It will put Long Island relatively as close to the centre of New York City as the Bronx is now. By means of a second tunnel under the Hudson River, distinct from the gigantic plan of the Pennsylvania railroad, this city is to be connected with Philadelphia by trolley. E. F. C. Young, President of the North Jersey Street Railway Company, has purchased the old Hudson River tunnel for this. — *Boston Herald.*

THE ALBERT MEMORIAL, LONDON. — It seems incredible that so important a public memorial as that erected in honor of the late Prince Consort in Hyde Park should be neglected. The London atmosphere is no respecter of persons or works of art, and the Albert Memorial appears to be destined to the common deterioration. Only thirty years have elapsed since it was completed, and yet Mr. R. M. Beachcroft has reported that during a visit on Sunday last a shower of mosaic from one of the gables fell at his feet. He was also informed that such a fall is of frequent occurrence. Some of the statuettes have been already disfigured owing to the softness of the marble, and the railing and gates are in a neglected condition. So elaborate a structure was unfitted to be placed in the open air of London. The delicate detail and the variety of materials employed appear to offer facilities for the inevitable process of disintegration, and only good work could have stood so long. On the other hand, it should be remembered that restoration is particularly difficult. Scaffolding would be regarded as an eyesore, and it would not be easy to employ a movable platform, from which reparation would be practicable as soon as needed, and which could be taken away when the work was executed. The Memorial, however, deserves careful attention. When decay once begins, it is apt to advance with unsatisfactory speed, and, in order to preserve a work in which so many artists coöperated, it may be necessary to enclose the Memorial in a shrine of glass, which would not be inappropriate in Hyde Park. — *The Architect.*

GALVANIC COLORING OF METAL. — In an abstract by *Lightning* of an article in *L'Electrochemie* on the coloration and protection of metals, a large number of receipts are given. Gilding on steel is imitated by galvanically coating with copper from a cyanide bath, then with a thin film of zinc. After drying and polishing, the article is heated in linseed-oil to 160 degrees Centigrade, when it is stated that the surface becomes of a red-brass color, as if there had been a real alloying of the copper and the zinc. Iron can be protected from rust by a layer of molybdenum, deposited from a bath containing one gramme of ammonium molybdate and fifteen to twenty grammes of ammonium nitrate per litre, with a current of two to five ampères per square decimetre. All varieties of iron can be covered with an adherent and unalterable deposit of peroxide of manganese by making them anodes in a bath containing about .05 per cent of manganous chloride or sulphate, with 5 to 25 per cent of ammonium nitrate, the bath being cold, the cathodes of carbon, using a weak current of one to two ampères. Selenite of copper is recommended for coloring iron and steel brilliant black or blue-black, according to the strength; the layer, after firing, is very permanent. The bath is made with selenious acid six to ten, copper sulphate ten, nitric acid four to six, to the litre of water. It can be also used for copper and brass with feeble currents. Mathey colors watch-hands and other small metal articles with gold or platinum, but not with silver, by placing them on an anode plate under about three cm. of solution, and dipping the cathode into the liquid over them until the required tint is produced. — *N. Y. Evening Post.*

INSURANCE GRAVEYARD. — Franklin Webster, editor of the *Insurance Press*, has made a very interesting compilation of underwriting corporations that have retired from business in the United States during the last two or three decades. The summary is rather appalling, and shows how narrow is the margin of profit obtainable from the business to-day, Mr. Webster speaks thus of the exhibit: "The *Insurance Press* knows no better way to emphasize the magnitude of the problems confronting fire-underwriters, to demonstrate the unwisdom of legislative attacks on the insurance business, and to explode the fallacies concerning insurance "profits," than to ask the American people to gaze upon the list of joint-stock fire-insurance corporations that have given up the struggle, and to reflect upon the causes of the failures The object-lesson is impressive. The *Insurance Press* has invited and received the coöperation of insurance-departments in making up the record that follows, and has made use of other data, especially reports by the National Board of Fire-underwriters. During the past twenty-five years the fire-loss in the United States has exceeded $2,800,000,000. This year the value of the property destroyed by fire will exceed $170,000,000. Nearly 1,200 fire-insurance companies with paid-in cash capitals, mutual companies not included, have gone to the wall in the United States. Nearly all of these companies have been either burned to death or crushed out of existence by oppressive laws.

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, JANUARY 11, 1902 No. 1359

CONTENTS

SUMMARY: —
The Displacing of the Single House by the Apartment-house in New York. — Arranging Surface-car Traffic at the Columbus Circle, New York. — *Municipal Affairs.* — The Interest and Value of Mural Decorations. — An Arbitrament with a Penalty for Non-acceptance. — The McKinley Memorial Schemes. — The Danger of Indefinite Terminology in Contracts. — New Members of the New York Municipal Art-Commission. 9
THE AMERICAN VIGNOLA. — VI. 11
ABINGDON, BERKSHIRE, ENGLAND. 12
TECHNICAL SCHOOLS OF GERMANY. 14
THE VILLA BORGHESE COLLECTION. 15
ILLUSTRATIONS: —
A Monument in the Cemetery at Stuttgart, Würtemberg. — The Denticulated Doric Order. — Study for two Houses on the Bay State Road, Boston, Mass. — A Competitive Design for a High-school House, Rock Island, Ill.
Frimley Court, Surrey, Eng.
Additional: House of C. C. Febiger, Esq., Philadelphia, Pa. — Living-room in the same House. — Views at the Paris Exposition of 1900: Palais des Invalides; Horticultural Building and Building of the City of Paris. — Views at the Paris Exposition of 1900: the Greek Building: Rue des Nations; — the Rue des Nations. — Portal: Church of St. Radégonde, Poitiers, France; — Portals: House of Jacques Cœur, Bourges, France. — Jubé Staircase: St. Etienne du Mont, Paris, France; — St. Vincent de Paul, Paris, France. . . . 15
NOTES AND CLIPPINGS. 16

TOO late in the season to allow us to perfect our plans and make announcement earlier, we determined to make a change in the manner and method of publishing our International edition, and we now give notice that the change impends and will have effect in the second quarter of the year. The change consists simply in gathering the extra illustrations which constitute the International edition into four quarterly issues in place of their being, as now, scattered through thirteen weekly issues. The result will be that the subscriber to the International edition will receive each week a copy of the Regular edition and with each quarter a quarterly volume in which will be collected the gelatine and other International plates. That is, a subscriber will receive exactly what he now receives, but it will reach him in what, we believe, will be a more acceptable and agreeable form. Amongst other advantages incident to this condensation of matter is the fact that it will enable us to publish in the same issue all the plates in illustration of a given building, instead of being forced to let them dribble out, a few at a time, in four or five different weekly issues, as in the past. — *From our issue for Jan.* 4.

THE building statistics of New York show a remarkable decline in the building of single houses within the last decade. In the year 1890 plans were filed for eight hundred and thirty-five single dwellings. Since then, the number has diminished annually, and, for 1901, the total is only a little more than one hundred. Evidently, the change is due to the increasing disposition of the inhabitants of the city to live in tenements or flats, but the fact that they like to live in tenements is itself of importance. It is not very many years since the only tenement-houses known in New York were those for the very poor, and it was with a certain disapprobation that the New Yorkers observed the experiments made in Boston in the way of providing "apartment-houses" for well-to-do people. A little later, some large apartment-houses on the Boston plan were built in the most fashionable quarters, so as to attract tenants who wished to count as dwellers on Fifth Avenue or Fifty-ninth Street without having to pay the enormous rents demanded for single houses on those thoroughfares. These houses proved very successful, and the fashion spread rapidly, until even the modest dwellings on the side streets are now, to a great extent, replaced by four-family flats, new single houses being built, at present, almost entirely for the very wealthy.

WHETHER the change is altogether advantageous is, perhaps, uncertain. There is a great deal to be said in favor of the one-family house, with its privacy and ample space, and its provision of parlors for entertaining friends; but entertainments in private houses are rather out of fashion in New York, even among the very rich, who find it easier to give balls at Sherry's or Delmonico's than at home, and the great majority of the inhabitants of the city can ill afford such expenses. In Paris, where dwellings have been for centuries divided, as they will soon be in New York, into "hôtels" for the very rich, and tenements for every one else, the people who live in apartments find no difficulty in holding their weekly receptions, and giving dinner-parties; and it is not certain that the afternoon teas in their modest parlors are not, after all, as pleasant to the participants as the crush of miscellaneous people at a general reception in this country.

AS for the privacy of the single house, as compared with the apartment-house, it should be remembered that the latter may, by proper planning and management, afford nearly or quite as much privacy as the individual dwelling. The earlier apartment-houses in New York were modelled after the pattern of hotels or club-houses, on the supposition that they would be occupied by congenial people, who would like to meet in the common reception-room or restaurant. Time has, however, shown that the tenants of such houses change so frequently that it is impossible, and often undesirable, to cultivate intimacy among them, and the tendency is now toward the Paris system, in which no common rooms are provided, outside of the *concierge's* lodge, in which a stranger may occasionally be accommodated, but in which, also, by putting the whole building under the guard of the *concierge*, a certain privacy is secured for all the apartments, which is very pleasant.

THE "Columbus Circle," in New York, where Broadway, Eighth Avenue and Fifty-ninth Street intersect, has long been an object of anxious study on the part of people interested in municipal improvements, partly on account of its artistic possibilities, as the centre from which seven crowded thoroughfares radiate, and partly on account of the increasing necessity for making some provision for the safety of the people who have to cross it, or be transferred from one to another of the three lines of surface-cars which meet there. The Rapid Transit Subway is now built beneath the Circle, and will have a station there, so that the importance of securing the safety of the public will soon be greater than ever. Under these circumstances, the Municipal Art Society has been thoughtful enough to have a plan prepared by Mr. C. R. Lamb, whose interest in such matters is well known in the profession, for modifying the present arrangement of surface tracks, and, incidentally, the general disposition of the Circle and its principal ornament, the Columbus Monument, which stands in its centre.

MR. LAMB'S idea for the treatment of the latter, as shown in the New York newspapers, consists in raising it on top of a circular colonnade, two stories high, which is roofed over, and is intended to serve as a shelter for people waiting for transfer between the surface-lines. It cannot be said that the newspaper presentation of this part of the scheme is extremely successful, as a matter of design; but architects will agree that the idea has great possibilities, and it is not likely that Mr. Lamb really designed the circular portico, with columns about their own length apart, which the newspaper artists produce as his work. In regard to the plan of the remodelled Circle we imagine that the profession will have nothing but praises. The tracks which now intersect nearly in the middle of it are, by Mr. Lamb's scheme, turned out of their direct lines, so as to form arcs of two concentric circles, with the Monument in the middle. The two circles provide a double track for all the lines, and they are so far separated as to admit platforms between them, which serve not only as "islands" of refuge for pedestrians crossing the Circle, but as safe standing-places for passengers waiting for their cars. The Subway Station is outside of the surface-tracks, and is entered from the sidewalk, after the fashion of the new Metropolitan stations in Paris, the sidewalks around the Circle being made of ample width for such purposes.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

MUNICIPAL AFFAIRS, one of the most interesting of the quarterly magazines, appears with a collection of valuable illustrated papers on the "Decoration of Cities," published with the coöperation of the Municipal Art Society. The proof-reading of these papers leaves something to be desired, and it is difficult for a person, sensitive on the point of spelling, to read of the "Piazza di S. Pedro," in Rome; the monuments of "Victorio Emanuelo," and "Christopho Colombo," in Genoa; the "Arch de Triomphe," in Paris, and the "Shöne Brunnen," in Nuremberg, without a small shudder; but the matter is otherwise good, and the illustrations are very pretty. Mr. Lopez, who writes on "Municipal Sculpture," well says that New York, with its beautiful approach from the sea, and its magnificent views over the Hudson and the Sound, is unrivalled among great cities for natural advantages; and he appeals for a greater public interest in adorning it with works of art worthy of its situation and its wealth. He observes, with justice, that even the sculpture now existing in public places in New York is, as a rule, "deplorably placed," so that while good statues lose the effect that they might have produced, even the poor ones, if judiciously arranged, would be quite tolerable.

IN regard to mural painting, Mr. Charles M. Shean, a very competent authority, calls attention to the lack of interest of Americans in the decoration which, in Europe, is regarded as essential to the completeness of a public building. There is no question that, as he says, American artists are quite competent to do such decorative work, but nobody seems to think of employing them. Now and then, it is true, the architect of some very costly public building succeeds, by herculean efforts, in persuading his building-committee to employ a good artist in painting a few panels, or, possibly, a ceiling; but the example is not followed; and where, in Belgium, or in some parts of Germany, even a village church would be decorated, often gratuitously, by accomplished artists or students of art, we find, in this country, such buildings, as a rule, ornamented either with stencilled diaper-work, of the oil-cloth order, or with mosaic, so enormously expensive that it is usually confined to a glaring little patch in the most conspicuous position near the front door. It is possible that something might be done, that has not yet been done, to disabuse the minds of the public in regard to the cost of painted decoration. Reading, as most people do, in the newspapers that a certain artist has contracted to paint a ceiling in a new court-house for forty thousand dollars, they conclude that mural painters are incapable of distinguishing with the naked eye any sum less than ten thousand dollars; and, not wishing to run the risk of a humiliating rejection of any suggestion of a smaller amount, as compensation for what they would like to have done in their houses, they content themselves with a less aspiring form of art. Now, the fact is that nine artists out of ten who could decorate a room with beautiful works, which would be a perennial delight to their owner and his friends, have never seen ten thousand dollars together in their whole lives; that, instead of being lordly persons, who, at home, roll in heaps of gold, they are quiet, modest people, who love to paint above everything else, and, if they can be sure of a very unambitious recompense, will gladly place out their best talent at the service of a considerate and sympathizing patron. Travelling people who have seen, for instance, the beautiful series of frescos in the cloister of the Insel Hotel, at Constance, explain their existence by saying that "artists in Germany work so cheaply"; but artists in America work just as cheaply as they do in Germany, and what the proprietors of the comparatively small Insel Hotel could afford to do, the owners of hundreds of American establishments of various kinds could do much more easily. In fact, hotel proprietors in this country are already known as patrons of the arts, presumably for the sake of profit. The Hoffman House "Bouguereau," in New York, has probably brought in to its owners many times its cost, which was certainly not trifling; and most architects can recall lesser attractions which serve a similar purpose in other hotels. We should be far from saying that all art should have a commercial purpose, or that hotels were the best place for the display of the fine arts; but a picture painted to please hotel guests is better than no picture at all; and the people who see good painting in a hotel may be thus reminded of the possibility of having something of the kind in their dwellings.

A VERY peculiar step in industrial matters, and one very honorable to all parties concerned, has been taken in a shoe-manufactory in New York. Some years ago, there was a dispute over wages in the factory, and, after it was settled, both employers and employed came to the conclusion that, for the future, it would be for their interest to settle their differences by arbitration. An agreement was therefore made, by which both sides agreed, in case of need, to refer such controversies to a committee of five persons, two to be chosen by the firm, two by the employés, and the fifth by the other four. It was agreed that the award of this committee should be final; and, as bodies of workingmen are not remarkable for their fidelity to their engagements, it was provided that each party should set aside a guaranty fund, to be forfeited in case it failed to abide by the award. The firm deposited at once the sum of ten thousand dollars for this purpose, and the employés paid out of their earnings a small sum each week, until each man had twenty-five dollars, and each woman fifteen dollars, invested in the fund, which was, with a confidence which is pleasant to note, held in trust by the firm, drawing interest at six per cent. Recently, the firm adopted a newly patented method of making lasts, which, in the judgment of the workpeople, increased the labor in some respects, and, in one department, they asked for an increase of one cent per pair in wages. The firm refused, thinking that the labor was not really any greater with the new process, and the question has now been referred to the arbitration committee, with the certainty that its award will be accepted by both sides, without interrupting the work, damaging the business of the firm by failure to meet contracts, or throwing poor people out of employment in the middle of winter.

A BILL is before Congress, supported both by the McKinley Memorial Association and the McKinley Memorial Arch Association, providing for a Commission to secure a site, and obtain plans and models, for a memorial arch, to be erected in the District of Columbia in honor of the late President. The bill provides that the Commission may pay to competing artists a sum not exceeding twenty-five thousand dollars "for plans, specifications and models." What this means is not very clear, and we cannot but regret the delay in the constitution of the long-desired National Art-Commission which would be enabled to have such projects laid before Congress in proper shape. If the bill proposes to set apart only twenty-five thousand dollars for all the artistic work in connection with the intended arch, the scheme might as well be abandoned at once; but if only preliminary designs are to be received in competition, the fact ought to be made plain. Whether a triumphal arch calls up most effectively the considerate kindness characteristic of our lamented President is a question which admits of discussion; but the artists do not have to decide it, and, under proper management, any form of memorial that may be preferred can be made creditable to American art.

CONTRACTORS and dealers in building materials should take note of a recent decision by the highest court in England. A certain corporation known as Steward and Company, which owns the Portland stone-quarries, was invited by the British Admiralty to submit a tender for stone, in such quantities, and at such times, as the Admiralty might require. Steward and Company replied, offering to furnish stone, to an approximate amount of two million tons, at a certain price. The Admiralty accepted the proposal for a supply of "about two million tons or such quantity as may be required." Later, the Admiralty gave notice that it had made a contract for its building work, and would not need any more stone. Steward and Company sued for the completion of the contract which, as was claimed, the Admiralty had made to take "about two million tons" of stone, and obtained a favorable decision, but the House of Lords reversed the decision, on the ground that the expression "about two million tons" was too indefinite to make the contract one for a specific quantity.

MR. HENRY RUTGERS MARSHALL, President of the New York Chapter of the American Institute of Architects, and Mr. John De Witt Warner, President of the Municipal Art Society, have been appointed members of the New York Municipal Art-Commission, to succeed Mr. C. F. McKim and Mr. Charles T. Barney, whose terms have expired. We need hardly say that, while the friends of public art will regret the retirement of Messrs. Barney and McKim, who have done much, not only to improve the city, but to educate public sentiment, their successors will have the entire confidence of the profession, and of artists everywhere.

THE AMERICAN VIGNOLA.[1]—VI.

PART I.—THE FIVE ORDERS.

GEOMETRICAL RELATIONS.

THE dimensions and proportions set forth in the previous paragraphs, and recapitulated in the Tables, enable one to draw the Five Orders, according to Vignola, with great accuracy and sufficiently in detail for all the ordinary purposes of the draughtsman and designer. The figures for the larger features are easily remembered, and the smaller divisions and subdivisions can for the most part be obtained by dividing the larger into two, three, four, or five equal parts.

But besides these arithmetical proportions some geometrical relations may be pointed out which are calculated greatly to facilitate the work of draughtsmanship, drawing being naturally more closely related to Geometry than to Arithmetic.

LINES AT 45 DEGREES.

The proportions of any figure that is as wide as it is high, and which can accordingly be included within a square, are most easily determined by drawing the diagonal of the square, that is to say, by drawing a line with a 45-degree triangle. Such figures are, as is shown in the Illustrations, the projections of: —

1. The Echinus, in the Tuscan, Doric and Ionic Capitals (83, 84).

2. The Abacus, in the Tuscan and Doric Capitals (83, 84).

3. The Astragal, in all the Orders.

4. The Architrave, including the Tænia, in the Tuscan and Doric Orders, counting from the axis of the Column (83, 84).

5. The Tænia itself, and the Cymatium which takes its place (83, 84).

6. All the Cornices, except the Doric (83).

A line drawn at 45 degrees through the Doric Cornice gives, where it cuts the upper line of the Cornice: —

7. The face of the Corona, in the Denticulated Doric (84).

8. The face of the Mutule in the Mutulary Doric (84).

A line drawn at 45 degrees through the Doric Architrave and Frieze, from a point on the axis of the Column and of the Triglyph, taken either at the bottom of the Architrave or at the top of the Frieze, gives: —

[1] Continued from No. 1352, page 61.

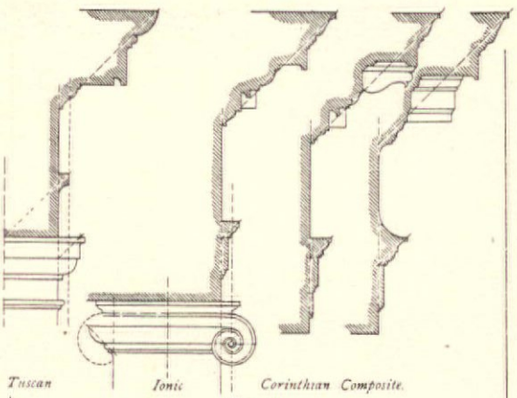


Fig. 83.

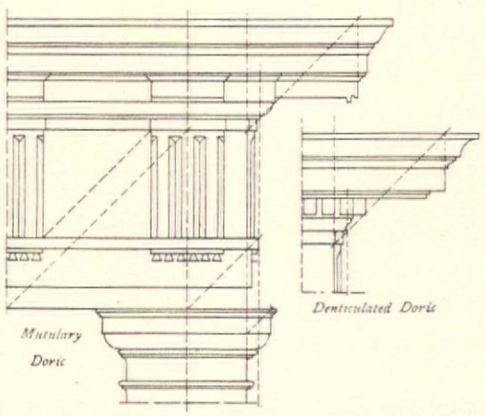
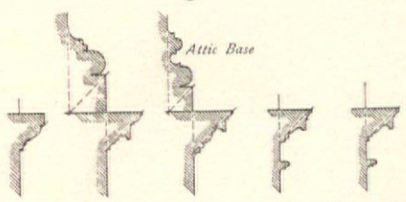
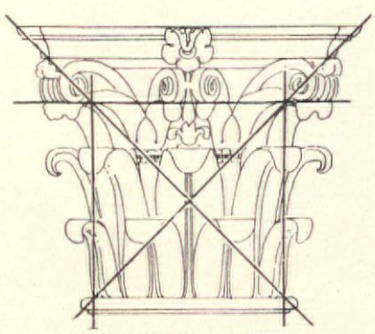


Fig. 84.



Caps of Pedestals.
Fig. 85.


THE CORINTHIAN CAPITAL.
Fig. 86.

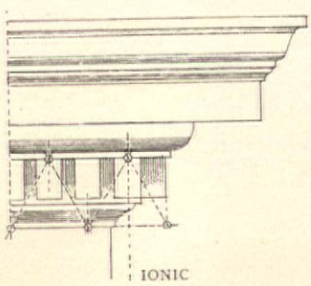


Fig. 87.

9. The Axis of the next Triglyph, and so on (84).

A 45-degree line also gives: —

10. The Caps of the Pedestals, except the Tuscan (85).

11. The Plinths of the Doric and Attic Bases (85).

Lines drawn at an angle of 45 degrees across the Corinthian Capital from the extremities of its lower diameter give (86): —

12. The width of the Abacus.

Where they cut the line of the upper diameter of the shaft, extended, they give: —

13. The Depth of the Scroll.

LINES AT 60 DEGREES.

In like manner, lines drawn at an angle of 60 degrees through the Bed-mould of the Ionic Cornice from a point on the axis of the Column, taken either on the upper line of the Frieze or on the upper edge of the Dentil Band, give, where they touch the upper line of the Frieze and the upper line of the Dentil Band: —

14. The Axes of the Dentils, and the outer face of the Double Dentil (87).

Similar lines drawn at 60 degrees in the Corinthian Cornice, taken from a point where the axis of the Column cuts the lower edge of the Corona, give,

(*a*) Where they cut the lower edge of the Corona, the upper line of the Frieze, and the lower line of the Ovolo: —

15. The Axes of the Modillions and of the Dentils, and the outer face of the Double Dentil, very nearly (88).

(*b*) Where they cut the lower line of the Modillion Band: —

16. The width of the Modillion, and the outer face of the Modillion Band (88).

(The distance from the edge of the Corona down to the lower edge of the Modillion Band is one-third the distance down to the top of the Frieze, and the distance down to the lower edge of the Ovolo, one-half.)

THE IONIC CAPITAL.

A line *cb* drawn through the Eye of the Ionic Scroll parallel to the line *CB* shown in the figure, gives,

At its intersection with the lines that define the top and bottom of the Scroll: —

17. The limits of a Fret within which the Scroll can be constructed (89).

VERTICAL LINES.

The outer line of the upper Diameter of the Shaft gives, in all the Orders (83, 84): —

18. The face of the lower band of the Architrave, and

19. The face of the Frieze.

In the Denticulated Doric, it gives (84): —

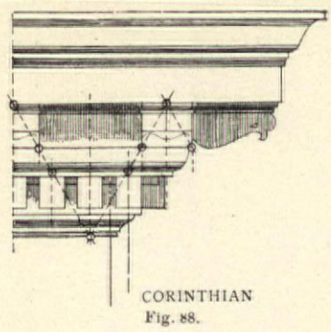
20. The outer face of the first Dentil, next the Double Dentil.

In the Ionic and Corinthian Orders, it gives (83, 84): —

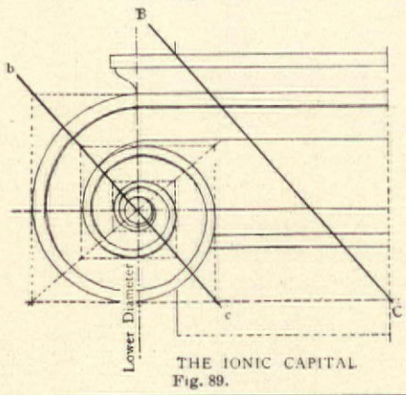
21. The axis of the first Interdentil.

The outer line of the lower Diameter of the Shaft, produced upwards, gives (83, 84): —

22. The projection of the Astragal,



CORINTHIAN
Fig. 88.



THE IONIC CAPITAL
Fig. 89.

in all the Orders, except the Tuscan and Doric.

23. The projection of the Tænia, in the Tuscan and Doric.

24. The projection of the Fillet, in the Bed-mould of the Mutulary Doric.

25. Twice the projection of the Triglyph, which is seen in profile.

26. Half the projection of the Tuscan Bed-mould, of the Tuscan and Doric Abacus, and of the Doric Mutule Band.

It also gives: —

27. The Axis of the Extreme Dentil, or first half of the Double-dentil, in the Denticulated Doric, Ionic, Corinthian and Composite Orders.

28. The position of the Eye of the Ionic Scroll, which is on a level with the bottom of the Echinus.

W. R. WARE.

[To be continued.]

ABINGDON, BERKSHIRE, ENGLAND.

ABINGDON is a very ancient town, the seat of royalty in Saxon times, and of a great abbey founded in 686 by King Cædwalla, for twelve monks of the Benedictine Order with rich endowments. The Danes demolished it in Alfred's reign; and by reason of the monks' indifference to the King's work in defeating their enemies or their inability to give him substantial help, the King took away from the Abbey its ownership of the town. Alfred's grandson Edred restored the possessions of the convent, and laid the first stone of the monastery, which, from being one of the largest in England, is now laid lower than the ruins of many of its contemporaries. It became a mitred abbey with huge possessions, far and near. Even in the Norman survey it had more than thirty manors, and at the dissolution it was valued at £1,876 10*s.* 9*d.* Hence, probably, the envy and hatred of the townsfolk, for in 1326 they wickedly and sacrilegiously plundered it.

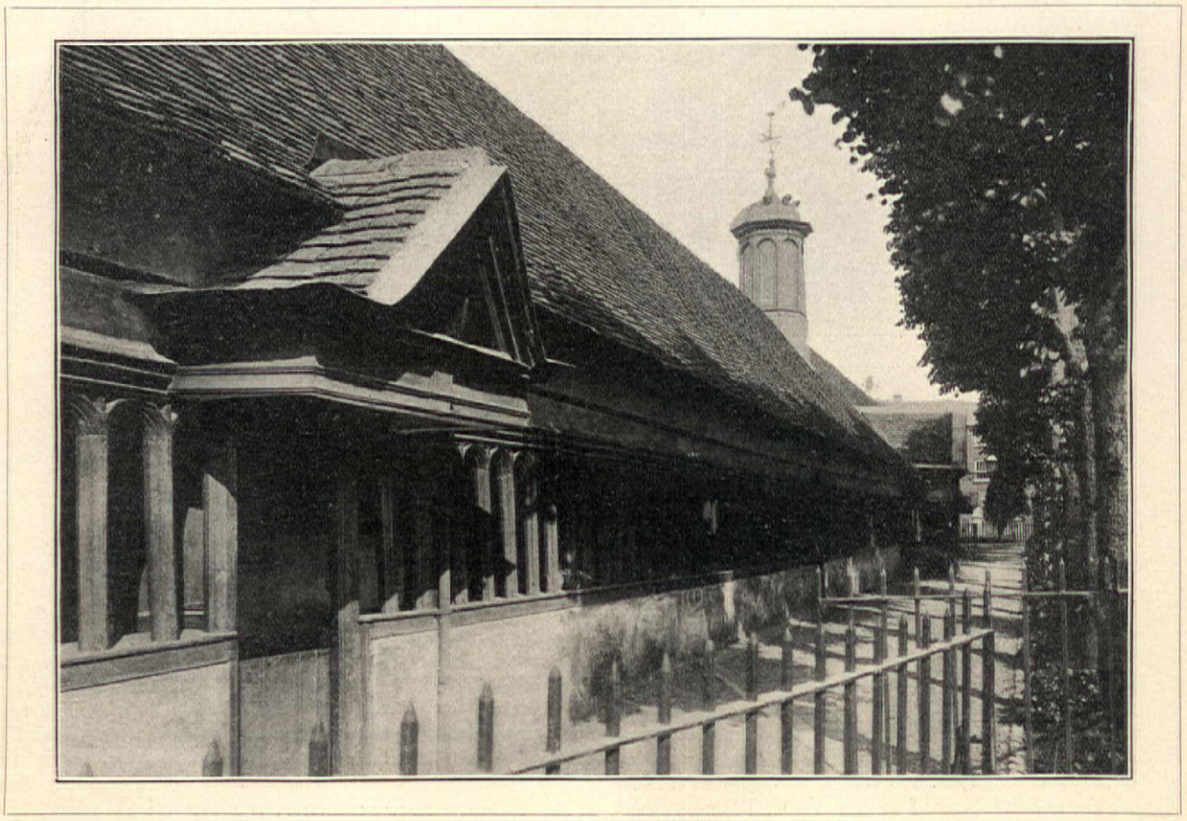
Church of St. Nicholas, Abingdon.

Leland speaks of it as a magnificent pile of buildings in his time, ranging in architectural styles from Early Norman to late Perpendicular. It is now only a gateway, probably preserved through having been used as a jail, and some walls and fragments of windows in a building, the property of, I think, a brewer. The last abbot surrendered to the King, and thereby earned a pension of £200 a year, with permission to keep his country-house of Cumnor (of Amy Robsart fame).

Church of St. Nicholas and Christ Church Almshouses, Abingdon.

Cilla, sister of King Cædwalla, founded about 690 a nunnery near the Abbey, in honor of St. Helen, but it was removed later on to Witham, and St. Elen's became a manor in secular hands. In 1427 it belonged to the fraternity of the Holy Cross, and descended to the trustees of Christ's Hospital (in Abingdon), to whom it was given by Edward VI.

The Church of St. Nicholas was built about 1300, it is said, though the west door is certainly of older date. The tower is supported by a west wall with a small arched aperture at the end of the nave.



Christ Church Almshouses, Abingdon.

St. Helen's is a five-aisled church of late fifteenth century. It was built for a guild in 1539, by one R. A. who was buried in the altar-tomb in the north wall. One of the fraternity of the Holy Cross, Nicholas Gould, "ceiled" Our Lady's aisle in in the reign of Henry VI.

"In the worship of Our Lady
Pray for Nicholas and Amy,"

said the inscription.

England was always noted for large families, as we may see by a tablet which records that Mr. William Lee, who died aged ninety-two, had seventeen children (two wives), seventy-eight grandchildren, and one hundred and two great grandchildren — "that he had in his life-time issue from his loynes two hundred, lacking but three" (*Ashmole's Collections*).

A curious entry in the parish register shows that the spring assizes were held at Abingdon. "1569 — buried the 3 day of Marche, Margery Towseye, widdow, who was, at the assize then holden, quite of wichecrafte layde to her charge, and dyed this day in the streete, sodenlie, as she was going on her business."

The brotherhood of the Holy Cross was instrumental in building the bridges at Burford and Culhamford. The fraternity was incorporated by royal charter in 1442, and possessed land at £40 per annum for the purpose of keeping the road between Abingdon and Dorchester in order, and for the maintenance of thirteen poor men and women. The great cross erected by the brethren, "a goodly piece for beauty and antiquity," was "sawn down," by Waller's army, during the Civil Wars. In 1457 the brotherhood was well-to-do, and upon the day of the Invention of the Holy Cross (3d May) they made "a bountiful feast, unto which came many of the brethren and sisters of the society." They spent, usually, "6 calves, costing 2*s.* 2*d.* each; 16 lambs, 12*d.* each; 80 capons, 3*d.* each"; above "80 geese, 2½*d.* each; 800 eggs, at 5*d.* a hundred, many marrowbones, much fruit and spice, great quantities of milk, cream and flour." (Wheat was sold at 12*d.* a quarter in the thirty-third year of Henry VI.) They also had much sent them by their tenants. But, besides themselves, they had "twelve priests to sing a dirge," to whom they gave "4*d.* for their pains." They also had twelve minstrels, "to make them merry" (after the dirge?), to whom 2*s.* 3*d.* apiece was given, "besides their diet and horsemeat." They also had processions and plays, and games to "captivate the senses of the zealous and to allure the people into greater liberality." Those who sat at dinner paid one rate — those who stood, another.

At the first endowment of Christ's Hospital out of the funds of the brotherhood of the Holy Cross, the thirteen poor men and women received each about £6 a year and their "liveries."

A new building was erected in 1718, and eighteen "poor persons received 6*s.* 1*d.* a week each, and clothes every two years. The original building has been much repaired, but its character, and its material, timber and plaster, have been preserved. It has a corridor the whole length of the building from which the doors of the houses are entered." It is "draughty," the old folks say; but a covered way in the air must be a boon when fetching water, and a refreshment as a summer sitting-place. On the gabled front is an allegorical painting representing the duty of almsgiving, with portraits of Edward VI and Sir John Mason. Inside is a fine timbered hall with old furniture and portraits — not of value from the art point-of-view. At the back of the house is a fine old-fashioned garden. At the end of the building by the river is a "Crucifixion" under glass.

The Abbey Gateway, Abingdon.

Elfrida, who induced King Eadgar to kill her husband Æthelwold, and caused the death of Edward the Martyr (buried in the Abbey), held lands at Abingdon, but after the family troubles she retired to the Abbey of Amesbury. The Perpendicular gateway of the Abbey and the walls and windows near by are all interesting fragments of the great foundation which rivalled Glastonbury, Shaftesbury and St. Albans. The refectory has an open-timber roof, Decorated window and Henry III fireplace. The Norman church is described by Leland as being 560 feet long, with twenty-four columns on each side.

Henry III kept court at Abingdon in 1276. The town is well worth visiting from Oxford, and, with Cumnor and other places, is, historically, most interesting. S. Beale.

TECHNICAL SCHOOLS OF GERMANY.

No country does so much for the education of its people as Germany. The common schools are not only in reach of the poorest, but the tuition is free and attendance is compulsory in childhood. Hence, ignorance is a crime, and illiterates are no more numerous than criminals. Having passed through the common schools,

the young men and women of the country have an opportunity to qualify themselves by special training for any one of the ninety and nine occupations. In the university every branch of science is taught, and every path of learning may be followed as far as the ambition of the student prompts him to go. For those who prefer, or whose circumstances require them, to engage in commercial, mechanical or agricultural pursuits there are schools for training the hands as well as the minds for any department of human activity. There are schools for farmers, gardeners, florists, fruit-growers, foresters, blacksmiths, carpenters, machinists, cabinetmakers, bookkeepers, tailors, shoemakers and druggists; there are cooking-schools, institutes for training servant-girls, barbers and chiropodists. You can find a school in Germany for teaching anything you want to know, and it is usually supported by the Government and free to all comers, or perhaps only a nominal tuition is charged. There is no reason why any person in this great Empire should be ignorant of the duties pertaining to the place he is required to occupy.

It is complained, however, that the Germans are more technical than practical; that they are spending too much time in developing theories without putting them into practice; that the learned doctors are discovering all sorts of new diseases without finding remedies for them; that the electricians are spending thousands of dollars in developing motors that will run 150 miles an hour, when nobody wants to travel at that speed, and neglecting the ordinary tramway-systems which are required for the convenience of the public. It is undoubtedly true that more discoveries in the different fields of science are made in Germany than in any other country. It is equally true, on the other hand, that German genius very seldom derives any great pecuniary profit from its discoveries and inventions. You never hear of a rich inventor, and comparatively few patents are granted — probably not as many in all Germany as in the State of Connecticut alone. The patent laws are very exacting. They require that an invention shall not only be unique, but that it shall be useful, in order to receive a monopoly from the Government.

One of the most interesting features of German educational life is the "industrial art-schools" in which young machinists are trained to become foremen and superintendents of factories. There are eleven such schools in the city of Berlin, and they opened the fall term with 2,512 pupils. They are situated in different parts of the city to serve the convenience of the working-classes, for whose benefit they are intended. There are two systems — one which furnishes instruction in every branch of mechanical industry, including designing, drawing, carving, moulding, modelling, surveying, engineering, chemistry, the use of instruments of precision and every phase of electrical science and mechanics, six hours a day for six days in the week. For this an annual fee of 100 marks ($25) is charged. In this school are representatives of the middle classes of society, who are not dependent upon their own earnings for support — the sons of manufacturers, merchants and skilled mechanics who earn good salaries.

The other system appeals to a much larger class of the population, and about 2,000 young men who are compelled to earn their own living take advantage of evening and Sunday instruction, that is given them for a nominal fee of 4 marks for the year for an average of four lessons a week, and six marks a year for an average of six lessons a week. Of course, this fee is merely formal, and is intended to appeal to the self-sespect of the pupil and remove the odor of charity. For two hours each evening and for four hours each Sunday instruction is given those whose circumstances compel them to work during the week-days. To enter, a candidate must have already gone through the common schools and acquired a solid foundation of general information. He must also pass an examination in mathematics, and must have served an apprenticeship of at least a year at some mechanical trade. Upon entering the school he has an option of seven or eight different departments, all of them dealing with the construction and operation of machinery, electric-motors, pumping-apparatus, locomotive or stationary engines, spinning, weaving, moulding, the manufacture and handling of all sorts of tools, forging, and every other form of mechanism. The instructors are practical men, and each student must follow a practical course. No time can be wasted in experimental work. Upon entering the school he must select his trade, and he will be educated thoroughly in that particular line of industry, so that he may not only be able to operate, but to design and construct, the machinery that pertains to it.

Many of the graduates of the schools of industrial art from their own inertia or from the pressure of circumstances fall back into the ranks of wage-earners, but more have the force of character to become captains of industry and superintend the work of others. — *Berlin Correspondence of the Chicago Record-Herald.*

THE VILLA BORGHESE COLLECTION.

CLAUDE PHILLIPS writes in the London *Daily Telegraph:* It is with a sigh of relief that the lovers of great art have learned that the Italian Chambers have passed the necessary credit for the acquisition by the nation of the great Borghese Collection now housed in the Villa Borghese — at the Government price, however, and not at that of the seller. The masterpiece of Titian's first period, which will always be popularly known as "Sacred and Profane Love," although an Austrian savant, Herr Franz Wickoff, has now ingeniously found for it the more appropriate and convincing title "Medea and Venus," will not then, after all, occupy a place in a Fifth-Avenue or a Boston palace, but will continue, as heretofore, to be in every sense one of the world's treasures, and a joy forever to the nations, since to them in the higher sense it belongs, and must ever belong. The removal from Rome of such a wonder of art as this would be more than a national, it would be an international, calamity; and to none more than to the Americans themselves, since they are among the most indefatigable, the most passionate pilgrims to the shrines of art all over the world. Now, as heretofore, the worshipper will be able to turn — for a moment's rest from delight — from Raphael, Titian and Correggio to Nature, and dream a moment in sweet forgetfulness of self as he looks through the tall pines of the Borghese Villa at the beautiful mountain-ranges which, environing Rome, crown her with a higher and more august beauty.

No private gallery can now vie with the Borghese Collection, though, like all those which were brought together in the past centuries, it contains, with the pearl of price, a fair substratum of inferior things, and even of downright rubbish. The Bridgewater Gallery comes next, and then the Liechtenstein Gallery at Vienna, and Dorchester House. It is the five or six world-famous canvases which have made the great fame of the Collection, although it is, even in other respects, full of interest to the student. Since Giovanni Morelli (Lermolieff) wrote his now famous work "*Die Galerien Borghese und Doria Pamfili in Rom*," this Gallery has been the favorite battle-ground of the critics. Signor Adolfo Venturi, following some years later with a *catalogue raisonné*, controverted a good many of Morelli's statements and opinions, and then was himself in turn challenged on some important points. The large "Deposition," painted by Raphael in 1507, for Atalanta Baglioni of Perugia, is the most ambitious work produced by the youthful Umbrian before he entered upon his great labors in Rome. It is at the same time the least successful, the most tormented, the most artificial. We find here a kind of staleness, of artificiality, very singular at this still early stage of the wonderful career — a premonition of the radical defects of conception which, quite apart from Giulio Romano's coarseness of interpretation, will later on so distressingly mar the "Transfiguration," which was once deemed the crowning achievement of Raphael's maturity. The "Sacred and Profane Love," consecrated by the passionate admiration of successive ages, need not here be further discussed; but opposite it hangs another Titian, "The Education of Cupid," painted some sixty years later in the life of the Master of Cadore, and yet at least as wonderful in freshness, in brilliancy, in unity of conception, in poetry. Titian is one of the few painters — it is only among the master-geniuses that they are found — whose interest both in heaven and earth increased as he went on, even to the very end. Then there is the sombre, passionate "St. Dominic" from the same brush, and belonging also to the late time — a magnificent portrait-study, to which, as yet, insufficient justice has been done.

No picture in the Gallery excites a sympathy more profound than the "Portrait of an Unknown Man," by Lorenzo Lotto. Sumptuously yet sombrely attired, still in the early prime of life, this *anonimo* fronts the spectator with a look of hopeless sadness, of mute appeal against destiny. One hand crushes down a heap of crimson roses, half faded, amidst which lurks, white and sinister, a little death's-head; the other is pressed in an involuntary gesture of pain to the side. What physical agony, corroding fair manhood in a body nobly fashioned, or what mortal despair, oppressing and crushing the spirit, does Lotto here seek to reveal, to interpret for the few, while he half-veils from the many the tragedy of the body or of the soul? We shall never know. And therein lies, perhaps, the great charm of the picture. Nothing, even in this magnificent *ensemble*, surpasses in grandeur of realism, in pathos, in splendor of aspect, the half-finished "St. John the Baptist in the Desert" of Paolo Veronese, who only on the rarest occasions — as in the "St. Sebastian" in the church of that name at Venice, in the wonderful "Pietà of the Hermitage" at St. Petersburg, in the "Pilgrims at Emmaus," and the small "Crucifixion" of the Louvre — attains to such heights as these. The "Danaë and the Golden Rain" of Correggio, one of the few art-treasures pacifically retaken by Italy from England, though it is by no means intact, shows at his highest point the master who sacrificed too much to an earthly, yet more than human, suavity and grace, to a harmony like that of faultless music, oversweet; not, indeed, a greater painter than he is in the unsurpassable "Jupiter and Antiope" of the Louvre, but a more supreme artist. He stands here in much the same relation to Raphael that Praxiteles is seen to hold if we compare him to Phidias. His is an art in which sensuousness is still spiritualized, in which genius justifies and transfigures conceptions already, in their very beauty, on the gentle incline which will ultimately lead to decadence.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

A MONUMENT IN THE CEMETERY AT STUTTGART, WÜRTEMBERG.
HERREN EISENLOHR & WEIGLE, ARCHITECTS.

THIS plate is copied from *Architektonische Rundschau.*

THE DENTICULATED DORIC ORDER.

SEE article "The American Vignola" elsewhere in this issue.

STUDY FOR TWO HOUSES ON THE BAY STATE ROAD, BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

A COMPETITIVE DESIGN FOR A HIGH-SCHOOL HOUSE, ROCK ISLAND, ILL. MR. O. Z. CERVIN, ARCHITECT, MOLINE, ILL.

[The following named illustration may be found by reference to our advertising pages.]

FRIMLEY COURT, SURREY, ENG. MR. F. STEWARD TAYLOR, ARCHITECT.

THIS plate is copied from *Building News*.

[Additional illustrations in the International Edition.]

HOUSE OF C. C. FEBIGER, ESQ., PHILADELPHIA, PA. MR. HORACE SELLERS, ARCHITECT, PHILADELPHIA, PA.

LIVING-ROOM IN THE SAME HOUSE.

VIEWS AT THE PARIS EXPOSITION OF 1900: PALAIS DES INVALIDES; HORTICULTURAL BUILDING AND BUILDING OF THE CITY OF PARIS.

VIEWS AT THE PARIS EXPOSITION OF 1900: THE GREEK BUILDING: RUE DES NATIONS; — THE RUE DES NATIONS.

PORTAL: CHURCH OF ST. RADÉGONDE, POITIERS, FRANCE; — PORTALS: HOUSE OF JACQUES CŒUR, BOURGES, FRANCE.

JUBÉ STAIRCASE: ST. ETIENNE DU MONT, PARIS, FRANCE; — ST. VINCENT DE PAUL, PARIS, FRANCE.

NOTES AND CLIPPINGS

FIND OF COIN-FILLED ROMAN AMPHORÆ. — A discovery of ancient treasures is reported to have been made at Montalto in Liguria during the demolition of one of the most ancient churches in Italy. A small underground chamber was filled with objects of art dating back to the era of the Roman Empire. They consisted chiefly of silver amphoræ and vases, and were filled with gold and silver coins. — *Exchange.*

THE ARMS OF THE VENUS DE MILO. — A letter is published from the aged Admiral Reveillere, saying that M. Brest, a former French consul at Milo, who was influential in the acquisition of the Venus de Milo by France for the Louvre, once declared that he knew where the arms of the Venus were, but that no one should ever see them, because he thought the Government had given him too little credit for his share in the acquisition of the statue. Admiral Reveillere suggests that steps be taken to test the truth of M. Brest's statement concerning the arms. *Boston Transcript.*

PAINTING THE FIRTH OF FORTH BRIDGE. — The New York public has had the question of the painting of large bridges brought very forcibly and somewhat painfully to mind of late by the extraordinary disclosures of the report of the expert commission appointed by the District Attorney to examine the Brooklyn Bridge. In this connection a few facts regarding the system of painting adopted in the case of the largest and most important bridge in the world, the Forth Bridge, in Scotland, will be of interest. It seems that ever since this structure was opened for traffic, eleven years ago, the work of painting it has gone on without any interruption. A staff of about thirty-five men is employed on the work. They commence painting at the southern end of the structure (which, by the way, comprises two main spans of 1,710 feet and two shore spans of 700 feet), and the work proceeds daily, except on Sundays and in unusually stormy weather, until the northern end of the structure is reached. It takes three years to cover the full length of the bridge, which, in the cantilever portions alone, is about one mile in length. Hence it will be seen that this period of thirty-six months represents the useful life of the paint, since one coating is no sooner completed than the work is begun again. Already the huge structure is receiving its fourth coat. To enable the painters to conveniently reach every part of the structure the engineer in charge has devised a system of ladders and steam hoists. Where possible, ladders attached to the great struts and ties are made use of, but for reaching the loftiest portions of the cantilevers, which rise to a height of 360 feet above the piers, a series of permanent elevators have been installed. These are operated by means of steam winches, which are placed a little below the level of the roadway. In proximity to each elevator there is erected a house in which the paint is mixed. For painting the under side of the roadway permanent wire ropes are stretched along each side of the structure, from which the painters' platforms are suspended in such a way that they can be drawn along the rope very much after the manner of a cableway. Evidence of the throughness with which the work is done is seen in the fact that, so far, no portion of the bridge has shown any signs of decay or need for renewal. — *Scientific American.*

RAILWAY SUIT AGAINST A TRADE-UNION. — The trade-unionists are preparing vigorously to contest the claims of the Taff Vale Railway Company against the Amalgamated Society of Railway Servants. The amount claimed is about $125,000. This is the Company's estimate of the damage it suffered by the alleged conspiracy and combination of the Amalgamated Society in connection with the recent strike on the Taff Vale Railway. The House of Lords laid it down that a trades-union was liable for the action of its servants or members, and could be made answerable for such action in a court of law. Every trades-union throughout the country is watching the development of the case with the keenest interest. The union-leaders assert that the House of Lords' decision places the whole of their funds in jeopardy, and some unions are halting between the advisability of securing the bulk of their funds on the Continent, and of finding some means of putting their money safely away in England. — *N. Y. Tribune.*

THE DISCOLORATION OF BRICK. — A much-vexed question that has been discussed for many years by men of sound common-sense and great experience is that of the discoloration of brick. Some clays are a great deal more susceptible to discoloration than others, and even with the greatest care flashed brick is the result. In some instances kilns of tile are so badly flashed that the goods look like pieces of ware covered with Chinese characters. One of the chief causes of this discoloration or flashing is the setting of the tiles or brick too closely together to allow of the steam escaping. Again, when wood is used, even in small quantities, the color is likely to be poor. The steam that we have to contend with in the last stage of the burning is the principal cause of this, and on fine pressed-brick discoloration is much more noticed than on common brick. A superintendent of a large pressed-brick and tile works was at one time very much troubled with brick flashing, and did not find out the cause for a while, till one day he noticed that his men were raking out the ashpits and dousing them with cold water to cool them off. He thought that that perhaps was the source of the mischief, and stopped the practice, and, sure enough, he had no more trouble in that direction. Coal burnt too wet will sometimes produce the same result. The moisture in the atmosphere also exerts an influence in the same way. Of course we cannot control the weather, but we can see that our fuel is kept dry, and that our kilns are protected from the weather, and that goes a long way towards successful operation of the plant, and the cure of flashing. — *Stone Trades Journal.*

COPYRIGHT INFRINGEMENT. — It is decreed in the English Fine-Arts Copyright Act of 1862 that "if any person, not being the proprietor for the time being of copyright in any painting . . . shall, without the consent of such proprietor, repeat, copy, colorably imitate, or otherwise multiply for sale, or knowing that such repetition, copy or other imitation has been unlawfully made, shall sell . . . any copy . . . of the work . . . such person for every such offense shall forfeit £10." In the recent case of Hildesheimer *vs.* W. F. Faulkner, Ltd., which was an action brought to restrain infringement of the copyright by the defendants and to recover damages for the circulation of 1,012,600 copies of the plaintiff's pictures, it was decided by the trial court that the plaintiff was entitled to a penalty for each copy circulated, and that since this penalty must be some recognized actually existing sum in coin, the Court felt itself constrained to fix the penalty at a farthing for each copy. The defendants appealed. It was stated that the cost of producing a million copies of the picture was only about £100. The questions to be decided on appeal were: (1) Whether the order for the printing of a million copies constituted a million offences or only one offense. (2) Whether, if each copy constituted a separate offence, the penalty should be fixed at one farthing for each copy put in circulation, which would amount in the whole to £1,054 15*s.* 10*d.*, or whether it should be fixed at some smaller fraction of a penny for each copy. Lord Justice Rigby held that the Court was not bound to fix a sum made up of separate sums which would have been recovered if there had been a separate action for each offense. Lord Justice Collins, although holding that the defendants were technically within the law and that they had become liable in respect of a million copies, construed the statute to mean that a maximum and not a minimum penalty was inflicted. His Lordship could see no reason why in such a case the penalty should be limited in reference to a coin. In the present case the execution could only be for the aggregate sum. Lord Justice Romer, holding with his colleagues, found that if the statute were to be construed too literally the Court might be bound to award a sum which would obviously be far in excess of that which ought to be given, and the judgment would be doing that which the Act had carefully avoided doing, namely, fixing a minimum penalty. His Lordship could see no reason why, when the action was brought for a number of offences, a sum should not be given which, when divided by the number of offences, would give for each a fraction of the lowest coin of the realm. — *Scientific American.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, JANUARY 18, 1902 No. 1360

CONTENTS.

SUMMARY: —
The Matter of a new City-hall for Boston. — Death of Edward Clark, Architect. — The Corrosion or Non-corrosion of Steel Framework by Cement Concretes. — Architects again invited to give Bond for satisfactory Execution of a Building Contract. — Competition for the Emblem for the Louisiana Purchase Exposition. — The French View of the Proposal that an Architect shall guarantee the Cost of his Work. — A Scheme for Urban Improvement in Cleveland. 17
NOTES ON IRON AND STEEL CONSTRUCTION. — II. 19
THE PALACE OF THE QUEEN MOTHER, ROME. 22
COMMON CAUSES OF FIRES. 22
THE ACTION OF WIND AND WATER ON SEA-CLIFFS. 22
BOOKS AND PAPERS. 23
ILLUSTRATIONS: —
United States Post-office and Court-house, Freeport, Ill. — Additions to House of E. W. Clark, Esq., Chestnut Hill, Philadelphia, Pa. — Corridor: Palazzo Margherita, Rome, Italy. — The Kunstlerhaus, Munich, Bavaria: Gallery in the Banquet-hall; — The Main Staircase. — Details of the Banquet-hall: das Kunstlerhaus, Munich, Bavaria.
Monument to Charles Mathieu, Lourches, Nord, France.
Additional: Entrance: No. 411 Commonwealth Ave., Boston, Mass. — The Palazzo Margherita, formerly Piombino, Rome, Italy. — Main Staircase in the same Palace. — House of Mrs. Catherine Minot; — House of Robert S. Bradley, Esq. — "The Amalienburg," Munich, Bavaria. 24
NOTES AND CLIPPINGS. 24

TOO late in the season to allow us to perfect our plans and make announcement earlier, we determined to make a change in the manner and method of publishing our International edition, and we now give notice that the change impends and will have effect in the second quarter of the year. The change consists simply in gathering the extra illustrations which constitute the International edition into four quarterly issues in place of their being, as now, scattered through thirteen weekly issues. The result will be that the subscriber to the International edition will receive each week a copy of the Regular edition and with each quarter a quarterly volume in which will be collected the gelatine and other International plates. That is, a subscriber will receive exactly what he now receives, but it will reach him in what, we believe, will be a more acceptable and agreeable form. Amongst other advantages incident to this condensation of matter is the fact that it will enable us to publish in the same issue all the plates in illustration of a given building, instead of being forced to let them dribble out, a few at a time, in four or five different weekly issues, as in the past. — *From our issue for Jan.* 4.

THE inaugural address of Mayor Collins of Boston calls attention to the imperative need of a new City Hall. The present building is crowded and inconvenient, and only accommodates a small portion of the necessary offices, so that the city is obliged to pay about thirty thousand dollars a year rent for offices in various outside buildings, some of them at a considerable distance, so that business is carried on in them at great inconvenience. As the sum annually paid for the rent of inconvenient outside accommodations would provide interest on at least a million dollars, while the ground occupied by the present City Hall, with the old Court House, now occupied for city offices, is of immense value for business purposes, and would probably meet with ready sale, the financial advantage of making a change is manifest. Where the new City Hall should be placed is not so evident. Mayor Collins thinks that the present location among the banks and lawyers' offices in the northern part of the city is not so convenient as a more central one would be, but he forbears to specify particularly any other. It is, however, well known that a situation either in the neighborhood of the Public Garden or of Copley Square is favored by the people who have paid most attention to the interests of the city. The old plan, of erecting a building on Beacon Hill, near the State House, seems to have been definitely abandoned. A few months ago, a carefully studied scheme was proposed for extending Arlington Street across the old Providence-Station grounds, and placing the new City Hall in the space between this new street and Park Square. This would provide adequate space, in a very accessible location, although it may be questioned whether such a building would not deserve a more conspicuous site than an open space behind the back gates of the Boylston-Street buildings. Artistically and, in some ways, practically, the best location now available would probably be the Art-Museum lot, on Copley Square. The cost of this lot, which contains more than two acres, and borders on four streets, would probably not be excessive, while a building on it would show to the fullest advantage in the company of the Public Library, Trinity Church, and the other splendid structures which already adorn Copley Square, or will soon do so. As lines of electric cars from nearly every part of the city and suburbs pass through Dartmouth Street, Boylston Street or Huntington Avenue, this lot would be as accessible as that on Arlington Street. Either lot would, without question, form an admirable site for the structure, and, while architects, who naturally like to see a fine building placed in a conspicuous location, would probably favor Copley Square, a City Hall on the extension of Arlington Street could, by judicious management of the surroundings, be made imposing and beautiful.

THE profession will hear with great regret of the death, after a long illness, of Mr. Edward Clark, Architect of the Capitol at Washington. Mr. Clark was born in Philadelphia in 1822, and was assistant to Dr. Thomas U. Walter when the latter was engaged in the construction of the wings and dome of the Capitol from his own designs. On Dr. Walter's resignation of his position, in 1865, Mr. Clark succeeded him, and has ever since had charge of the building. As an available expert of high reputation, he was called upon to carry out many other duties in connection with the Government building work in Washington, and served on many commissions, those for the completion of the Washington Monument and the construction of the Congressional Library among others. He had long been a member of the American Institute of Architects, as well as of various other artistic and scientific bodies, and was highly esteemed by his associates, not only for his professional skill, but for his uniform courtesy and kindness to all with whom he was brought in contact.

THE President of the Boston Manufacturers' Mutual Fire Insurance Company, 31 Milk Street, Boston, asks information from architects in regard to their experience of the corrosion of structural steel under various circumstances. He says that it has been observed in England that concretes made with "breeze," or what we should call cinders, are often very destructive to iron and steel, and that, within his own knowledge, beams imbedded in concrete in foundations have been found to corrode very rapidly, in consequence, apparently, of some corrosive qualities of the concrete surrounding them. It is hardly necessary to say that these observations are of the very greatest importance to every one connected with the art of building. Many millions of dollars are invested every year in this country in buildings supported solely by columns of steel, surrounded by masonry set in cement, with, in the best buildings, a grouting of cement between the masonry and the metal. Experience has shown that corrosion, if it occurs at all, is likely to be most serious in the portions of the frame nearest the ground, for the reason, probably, that the moisture which all masonry contains, or absorbs from heavy rains, sinks by gravitation into the bottom of the mass; and it is precisely at this point that the loads are greatest, and failure of the metal would be most disastrous. Most engineers and architects in this country believe that if the metal is thoroughly cased with masonry in cement, or cement-concrete, in contact with it, there is almost no limit to its duration. Of course, no architect or engineer of experience would leave structural members of iron or steel in contact with plaster-of-Paris, which is well known to corrode the metal rapidly; and very recently it has been shown that paint, on iron intended to be buried in concrete or masonry, is of doubtful utility, if, indeed, it is not seriously injurious; but we do not think that any case has been made known to the profession, otherwise than as mentioned by Mr. Atkinson, where the corrosion of structural iron could be directly traced to cement-concrete in contact with it. It is possible that the cement used for making concrete in England may have contained ground slag, which often contains sulphur, and might, perhaps, develop a corrosive action on iron in consequence; but it is difficult to understand how the English "breeze," unless it is something very different from our coal cinders, could contain anything corrosive, or how, if it did, it could exert any material action on the metal through the pores

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

of the concrete of which it formed the aggregate. So far as our materials are concerned, we believe that there is little to fear from acid concrete or cement, and still less from acid cinders, but it is not impossible that the coating of paint so universally used may be more injurious than has been supposed. In a steel-frame building which was altered some years ago in New York, the first-story exterior columns were found deeply corroded, from some cause not explained, and it would be well worth while, in the case of similar alterations, to have the condition of the metal thoroughly examined; or even, where such immense sums are at stake, without insurance, as in the modern office-buildings, to lay bare, occasionally, the lower portion of one or two of the important supports of the frame for inspection. If any of our readers have any experience in the matter, it would be particularly desirable to make it known just now, when it will be of assistance in planning the thorough tests which Mr. Atkinson hopes to have made, primarily for the information of his insurance company, but incidentally for the advantage of the whole community.

THE attention of architects who have five thousand dollars that they are anxious to get rid of is invited to a proposition of the Milwaukee Commissioners of Public Works, who advertise for competitive plans for a school-house, to contain twenty class-rooms, assembly-hall, teachers' rooms and so on; to have approved systems of ventilation, heating and sanitation, and to cost complete, including fees of architect and inspector, not more than seventy-five thousand dollars. As this is about half the usual cost of school-buildings of these dimensions the Commissioners very prudently make sure that the architect shall contribute to the expense by requiring that he shall furnish an approved bond for five thousand dollars, guaranteeing the erection of the building complete, including the fees mentioned, for the specified sum; and as a reward for the ingenuity and generosity involved in such an undertaking, they promise the fortunate professional man "the usual compensation allowed by the city for such work," that is, four per cent on the first ten thousand dollars, three and one-half per cent on the second ten thousand, and three per cent on the remainder.

THE management of the St. Louis Exposition announce that an international competition is to be held for a design for a symbol, or emblem, to be used on the seals, stationery and other "publicity material" connected with the Exposition. No rules are laid down as to the lettering, sentiment, size or style of the design. It is only stipulated that it shall be symbolical of the historical event commemorated by the Exposition: the purchase by the United States, in the year 1803, of the Louisiana territory from France, by which, for the sum of fifteen million dollars, the United States secured the control of the Mississippi Valley. Under the terms of the competition, eight sculptors are to be selected, who are to be paid two hundred and fifty dollars each for their designs, but all artists are admitted to submit designs, which, it is promised, shall be judged on an equality with the others, by a jury of national reputation, and the author of the design placed first is to receive a prize of twenty-five hundred dollars. Six months is allowed for the preparation of the designs, but, as the circular is not dated, we are unable to say when the six months will expire, and we have no information as to the place at which competing designs are to be delivered. Probably these details will be given later. Meanwhile, it may be useful to know that more than two hundred volunteer designs have already been submitted, using such materials as a map of the Louisiana Purchase; portraits of Thomas Jefferson and Napoleon Bonaparte; the fleur-de-lis, the eagle and the Napoleonic N; the intertwined flags and arms of France, Spain and the United States; the Mississippi Bridge, and other devices, none of which were considered suitable; so that competitors will do well to avoid these combinations.

L'ARCHITECTURE quotes from the *Bulletin* of the French Société des Architectes Diplômés an interesting article on a matter of professional etiquette. It seems that a member of the Society, in considering a matter of employment to carry out some municipal works, was told by the town officials that a brother architect had guaranteed, in a similar case, if the cost of the building carried out from his designs should exceed the contract price, to pay the excess out of his own pocket up to a certain limit, the inference being that, if he wanted to secure the commission, he must make a similar promise. The member had doubts of the propriety of such a course, and applied for counsel to the officers of the Society. He received two replies, one from M. Louis Bonnier, President of the Society, who advised him "very politely, but very firmly" to decline compliance with the suggestion; and the other from M. Guadet, perhaps the most distinguished of French architects, who, in a letter which was shown to the officials of the municipality, and which led them to recede from their position, said that an architect could not, and should not, agree with any client to pay the excess of cost of a building over the contract price, for the reason, among others, that the architect does not participate in the contractor's profits, and that an agreement to assume all, or a part, of the losses of an undertaking, without a provision for sharing in the profits, is forbidden by the French law. M. Guadet observed also that a contract of the kind proposed, between an architect and his client, even supposing that it could be legally made or enforced, would destroy the position of the architect as the guardian of his client's interests by creating for him an interest directly opposed to that of his client, and inciting him to admit, for the sake of saving his own pocket, economies which it would be his professional duty not to tolerate; and he pointed out, as we have ourselves done in a similar case, that such a contract, even if it were legal, would, in practice, be absolutely worthless as a protection to the client, for the reason that the slightest modification from the plans and specifications, made at the desire or request of the client, after they had once been accepted, would release the architect entirely from his guaranty; and, as M. Guadet says, no building was ever carried out without such modifications. In this country sharp town officials, who probably understand better than the architects the illegality and futility of such contracts, usually put their proposition in the form of a demand that the architect shall deposit a certified check or a sum in cash as a guaranty. We do not know that we ever heard of an architect's complying with the demand; but the object of making it is, evidently, to enable a municipality, by setting up absurd claims in place of those which, in practice, never have a real or legal foundation, to compel the architect to engage in a long and costly lawsuit to get his money back; and, in that way, to induce him, as an alternative, to submit to a "compromise," or, in other words, to pure and simple extortion.

M. GUADET speaks of another point which has been much discussed in this country, and in regard to which professional opinion, as well as professional practice, varies. He mentions, in a postscript to his letter, that an agreement is sometimes made between architects and municipalities, or other important clients, that the architect shall not receive a commission on any excess of cost of the building over the contract price, unless it shall appear that the excess was due to changes or increase in the amount of work made at the desire of the client. Such an agreement he considers legal and unobjectionable; and, although it opens the way to differences of opinion as to what extras, if any are ordered, should be added to the sum on which the commission is reckoned, it does not act as an inducement to the architect to wink at violations of the contract for the purpose of reducing the cost; and a skilful architect and a reasonable client rarely find any difficulty in settling their accounts.

THE citizens of Cleveland, Ohio, have in contemplation a scheme which promises great results. It happens that a new post-office, a court-house, and some other public buildings are to be erected in the city within a short time, and the suggestion was made that the buildings should be so arranged as to improve the effect of all by suitable grouping. The suggestion was received with a favor which is most creditable to the intelligence of the city, and the Federal Government signified its willingness to aid the scheme by taking land for the post-office in such a situation, within reasonable limits, as might be best adapted to the general plan. In general, the scheme proposed is to form a wide street, running north and south, on either side of which the public buildings are to be arranged, the cross streets accommodating the private structures which always crowd into the neighborhood of the public ones. Nothing could be either more simple or more convenient than this plan, and it is much to be hoped that it may be carried out. We should like to see the central "boulevard" laid out with occasional deviations from perfect straightness and of varying width, believing that the beauty of effect of the buildings and of the street could be enormously increased in that way; but it is, perhaps, too much to hope that any American city engineer would consent to such an innovation.

NOTES ON IRON AND STEEL CONSTRUCTION.[1]—II.

THE principal structural members in any framed construction are the beam, or girder, and column, and since all the rules and formulas for determining the strength of such members are based upon values which are called the properties of the section, it is necessary to understand the calculations and methods for finding these values and their application, in the design of the structural members.

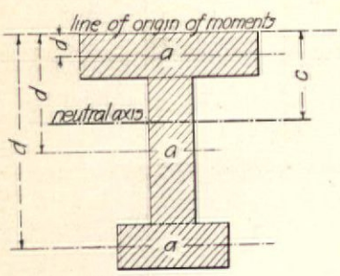


Fig. 1.

The two values of interest to the structural-engineer are the moment-of-inertia, and the radius of gyration. These terms are more or less meaningless and are simply names given to the values of a structural section in resisting flexure, and failure through flexure from compression, and are the only values by which one section can be compared with another in its ability to withstand the stresses to which the members are subjected.

In determining the moment-of-inertia, and the radius of gyration is found from this value, the determination of the moments of the individual fibres, or infinitely small areas of the section about a certain line, is the principle of the calculation. This line is called the neutral axis, and is considered as passing through the centre-of-gravity of the section, and is always taken at right angles, or perpendicular to the direction of the load action.

When the section is symmetrical — that is, equally proportioned on each side of a centre line, the neutral axis is coincident with the centre line, and requires no determination. When however, the section is not symmetrical, there are three methods which may be employed in the determination of the position of the neutral axis; they are: the mechanical, the mathematical, and the graphical. Where only approximate results are required and the section is somewhat complex, the mechanical method is sufficiently accurate for all practical purposes. This method has been recommended by Trantwine and others, and consists of cutting out an accurate scale pattern of the section, from an even thickness of cardboard, and balancing it on a knife-blade so that the blade is perpendicular to the direction of the load, in a beam section, or, in the case of a column section, usually perpendicular to the least diameter of the column section. A line marked where the knife-blade rests when the pattern is balanced is the position of the neutral axis.

The mathematical method of determining the neutral axis is quite simple, and consists of multiplying each simple elementary area by the distance between its centre-of-gravity and a line without the figure, called the line of origin of moments, and dividing the sum of these products by the entire area of the section. The result so obtained will be the distance that the neutral axis is located from the line of origin of moments. This distance is usually designated as the distance *c*. The algebraic formula which expresses this rule is clearly understood when reference is made to the preceding sketch, designated as Figure 1. In the formula which may be written thus:

$$c = \frac{\Sigma a d}{A}$$

c equals the distance which it is desirable to obtain, *a* equals the area of each simple elementary section, *d* the distance from the centre-of-gravity of each simple elementary section to the line of origin of moments, while Σ signifies, as usual, the summation of the anteceding quantities. The application of this formula may readily be understood from the following: —

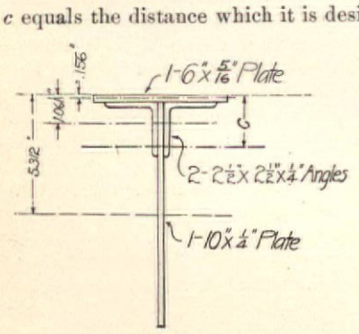


Fig. 2.

Example. — In the section marked Figure 2, what is the distance *c* from the line of origin of moments?

Solution: —

Area *a* of	6″ × 5/16″ plate.....	= 1.872	square inches.
Area *a* of two	2½″ × 2½″ × ¼″ angles	= 2.38	" "
Area *a* of	10″ × ¼″ plate.....	= 2.50	" "
	Total area.....	= 6.752 = *A*.	

The *a d* for each elementary section equals: —

Flange plate	1.872 ×	.156 =	.292
Flange angles	2.38 ×	1.062 =	2.527
Web plate	2.50 ×	5.312 =	13.280
And the summation.....		=	16.099

Upon substituting these values just found in the formula $c = \frac{\Sigma a d}{A}$ it becomes $c = \frac{16.099}{6.752}$ or 2.38, which is the distance in inches from the outside fibre of the flange-plate to the neutral axis.

The graphical method of determining the neutral axis or the position of a line passing through the centre-of-gravity of a section is readily applied, and is preferred by many on account of its simplicity and reliability.

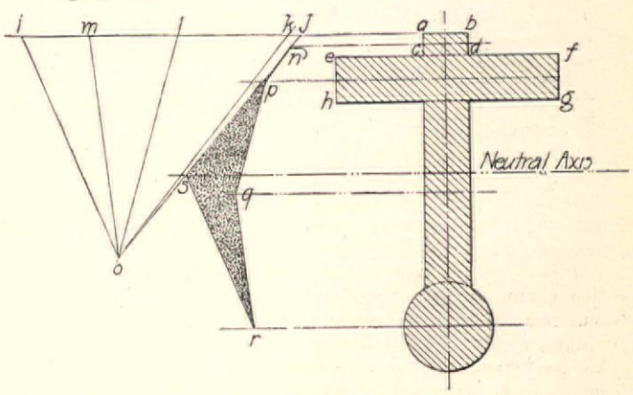


Fig. 3.

Figure 3 shows the section of a cast-iron rib, which may be a cast-iron rafter member in a skylight, or any other structural member. The problem, to determine graphically the position of the neutral axis of this section, may be proceeded with as follows: Through the centre-of-gravity which may be determined by inspection of each simple elementary section, such as *a b c d*, or *e f g h*, draw horizontal lines as shown in Figure 3. From the outside line of the section draw any indefinite horizontal line, as *a i*, and upon this line lay off spaces to scale which represent the areas of the respective elementary figures composing the section. For instance, the area of *a b c d* equals one-half of a square inch, and the area of *e f g h* equals 5 square inches; if the selected scale has been such that one-half of one square inch equals one-half inch in length, then the distances *j k*, *k l*, which represent the areas of *a b c d* and *e f g h*, will be one-fourth and 2½ inches respectively. Having laid off also the distances *l m* and *m i*, equal respectively to the areas of the web and bulb of the section, proceed with the figure by drawing to any point outside the horizontal line, as *o*, lines from the point *j k l m* and *i* as previously laid off. From *n* draw a line *n p* parallel to *k o*, and from *p* draw a line *p q* parallel to *l o*; likewise from *q* draw a line parallel to *m o*, and from the last point, *r*, just found, draw the line *r s* back until it intersects *j o* at *s*. A horizontal line drawn through the point *s* will coincide with the neutral axis and will pass through the centre-of-gravity of the figure. The method just described is quite useful when it is necessary to deal with a very irregular figure, and is a part of the graphical method for determining the moment-of-inertia of complicated sections which will be described directly.

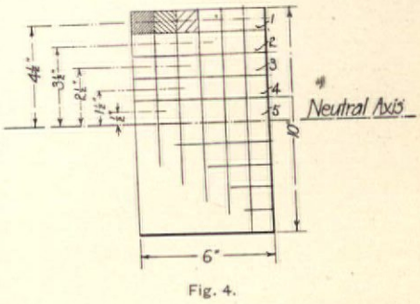


Fig. 4.

The principal end in view in determining the position of the neutral axis is in order to be able to conveniently calculate the moment-of-inertia. This value, the moment-of-inertia, may be found for any section by dividing that section into as nearly

[1] Continued from No. 1358, page 5.

as possible unit areas, and finding the sum of the products of each elementary unit area by the square of the distance from its centre-of-gravity to the neutral axis. In applying this rule take, for instance, the following problem, which consists of the solution for the determination of the moment-of-inertia of the rectangular section shown in Figure 4.

The outside elementary or unit areas marked 1 have a value equal to $4.5^2 \times 6$ (their number), or 181.50; there are, however, an equal number on the other side of the neutral axis, and, consequently, the rectangular section under consideration has twelve elementary areas possessing the same value when considered in reference to their distance from the neutral axis; in fact, the elementary or unit areas are here considered as one inch square, though they may as well have been regarded as infinitely small in area, and thus represent the fibres of the material of which the beam section is composed. If such a calculation were possible, accurate results would be obtained by this method of calculation. But to continue the solution of the problem: there exists, besides the twelve outside elementary areas marked 1, the second set, and likewise the third, so that the entire value, or the moment-of-inertia of the section, may be calculated and tabulated as follows: —

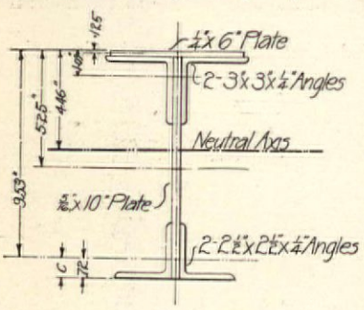


Fig. 5.

Fibres or areas marked 1 $= 12 \times 4\frac{1}{2}^2 = 243.00$
Fibres or areas marked 2 $= 12 \times 3\frac{1}{2}^2 = 147.00$
Fibres or areas marked 3 $= 12 \times 2\frac{1}{2}^2 = 75.00$
Fibres or areas marked 4 $= 12 \times 1\frac{1}{2}^2 = 27.00$
Fibres or areas marked 5 $= 12 \times \frac{1}{2}^2 = 3.00$
Total ..... $= 495.00$

This value, then, represents the moment-of-inertia for the rectangular section designated in Figure 4, and is sufficiently accurate for all practical purposes.

This method just described is useful from the fact that it can be applied to any section, no matter how irregular, and all that need be done is to draw the section to scale and divide it into elementary areas as accurately as possible, and proceed with the calculation as explained.

Where the section is a simple geometrical figure, such as a rectangle, circle, triangle, or where it is a combination of several such elementary sections, it would be somewhat tedious to make an extensive calculation like that just explained. Since, therefore, these simple elementary sections are used almost exclusively in construction, formulas which will express the value of the moment-of-inertia for the different sections have been deduced by higher mathematics, and are included in the usual memoranda, or data, of the structural-engineer, as follows: —

PROPERTIES OF USUAL SECTIONS IN CAST-IRON — CORRECT VALUES.

A = total net area of section. I = moment-of-inertia.

Section.	Moment-of-inertia.	Section modulus.	Least radius of gyration.	Distance from lower edge of section to neutral axis.
	$\frac{b\,d^3}{12}$	$\frac{b\,d^2}{6}$	$\frac{b^2}{12}$	$\frac{d}{2}$
	$\frac{a^4-b^4}{12}$	$\frac{a^4-b^4}{6\,b}$	$\sqrt{\frac{a^2+b^2}{12}}$	$\frac{a}{2}$
	$\frac{A\,d^2}{16}$	$\frac{A\,d}{8}$	$\frac{d}{2}$	$\frac{d}{4}$
	$.0491\,(D^4-d^4)$	$.0982\,\frac{D^4-d^4}{D}$	$\frac{D}{2}$	$\frac{1}{4}\sqrt{(D^2-d^2)}$
	$\frac{b'n^3+bn'^3-(b-b')\,a^3}{3}$	$\frac{I}{c}$	$\frac{I}{A}$	
	$\frac{bh^3-2\,b'\,h^3}{12}$	$\frac{2\,I}{h}$	$\frac{I}{A}$	
	$\frac{h^4}{12}$	$.1178\,h^3$	$\frac{h}{3.46}$	

PROPERTIES OF USUAL ROLLED-STEEL SECTIONS. — APPROXIMATE VALUES.

A = total net area of section. For minimum sections.

Section.	Moment-of-inertia.	Section modulus.	Least radius of gyration	Distance from lower edge of section to neutral axis.
	$\frac{A\,d^2}{6.1}$	$\frac{A\,d}{3}$	$\frac{b}{5.2}$	$\frac{d}{2}$
	$\frac{A\,d^2}{6.73}$	$\frac{A\,d}{3.3}$	$\frac{b}{3.56}$	$\frac{d}{2}$
	$\frac{A\,d^2}{10.4}$	$\frac{A\,d}{7.4}$	$\frac{d}{3.5}$	$\frac{d}{5}$
	$\frac{A\,d^2}{9.9}$	$\frac{A\,d}{6.7}$	$\frac{d\,b}{2.6\,(d+b)}$	$\frac{d}{3.1}$
	$\frac{A\,d^2}{10.9}$	$\frac{A\,d}{6.7}$	$\frac{b}{4.66}$	$\frac{d}{3.3}$
	$\frac{A\,d^2}{19}$	$\frac{A\,d}{7.6}$	$\frac{d}{4.74}$	$\frac{d}{2}$

While the first of these tables is accurate, the second is only approximate. That this second table of formulas cannot be exact is due to the fact that a certain depth and weight, of beam or channel, may have the metal in its section distributed in several ways, — for instance: the beam may have the bulk of the material in its section located in its web, while another beam of the same depth and weight per foot, maybe, will have the greater proportion of the material located in the flanges.

In the formulas for determining the transverse strength of beams is introduced a value derived from the moment-of-inertia, and it is usually called the section modulus, though it has been called, rather erroneously, it would seem, resisting moment or moment of resisting, and, also, resisting inches.

This value, the section modulus, is found by dividing the moment-of-inertia of the section by the greatest distance from the neutral axis to the outside fibre of the section. If the section modulus is represented by Q, and the moment-of-inertia by I, with the distance from the centre-of-gravity or neutral axis of the section by c, the formula for the value is $Q = \frac{I}{c}$. This value Q is necessary in determining the resistance to transverse strength of beams and built-up sections, and, consequently, it is often necessary to determine the moment-of-inertia of compound sections in order to ascertain their section modulus, and, subsequently, strength of the beam represented by the section.

Since nearly all compound structural sections composed of rolled steel are made up of several rectangular sections, or of rolled sections whose properties are known, the moment-of-inertia of such sections is readily obtained by observing the following:

Rule: — The moment-of-inertia of any compound section is equal to the sum of the products of each elementary rectangular figure composing the section, by the square of the individual distance between its centre-of-gravity and the neutral axis of the entire section, plus the moment-of-inertia of each elementary rectangular figure.

This rule is more concisely stated in the formula $I = \Sigma\, a\, d^2 + i$, in which Σ, or Sigma, represents, as before stated, the summation of the several values found by applying the succeeding formula to the several elementary rectangular sections; a equals the elementary area; I equals the distance from the centre-of-gravity of the elementary area in question to the neutral axis of the section, and i equals the moment-of-inertia of the elementary area or figure under consideration.

In applying the above rule and formula, let us consider the moment-of-inertia for the section shown in Figure 5.

It is first necessary to find the location of the neutral axis, which is accomplished by applying the formula previously given: $c = \frac{\Sigma\, a\, d}{A}$ and making the calculations as follows: —

Flange-plate ..... $\frac{1}{4}'' \times 6''$; $a\,d = 1.5 \times .125 = 1.875$
Flange angles ..... $3'' \times 3'' \times \frac{1}{4}''$; $a\,d = 2 \times 1.44 \times 1.09 = 3.139$
Web-plate ..... $\frac{5}{16}'' \times 10''$; $a\,d = 3.12 \times 5.25 = 16.380$
Lower flange angles $2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{1}{4}''$; $a\,d = 2 \times 1.19 \times 9.53 = 22.681$
The sum of $a\,d$ for each elementary section..... $= 44.075$

The total area of the entire section equals 9.88, and, consequently, distance c equals $44.075 \div 9.88$, or 4.46 inches from the

line $a\,b$, or origin of moments. The section redrawn, with the neutral axis located and the dimensions given, necessary in order to calculate the moment-of-inertia, is shown in Figure 6, and the calculation may proceed as follows: —

$$I = \Sigma\, a\, d^2 + i$$

Then $a\,d^2 + i$ for

Flange plate.....	$\frac{1}{4}'' \times 6''$	$= 1.5 \times 4.335^2 +$	$.0078 =$	28.19
Flange angles.....	$3'' \times 3'' \times \frac{1}{4}''$	$= 2 \times 1.44 \times 3.37^2 +$	$2.48 =$	35.16
Web plate.....	$\frac{5}{16}'' \times 10''$	$= 3.12 \times .79^2 +$	$26.04 =$	26.23
Lower flange angles	$2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{1}{4}''$	$= 2 \times 1.19 \times 5.07^2 +$	$1.40 =$	62.56
		Total, or $\Sigma\, a\, d^2 + i =$		152.14

Which result is the value for the moment-of-inertia for the built-up section. The section modulus can be found by dividing the value, 152.14, just found, by the distance from the neutral axis to farthest outside fibre, which is 5.79 inches. Making this division, the section modulus for the section shown in Figure 5 and 6 is found to be 26.3.

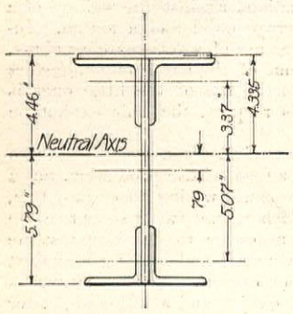


Fig. 6.

In making the calculations for the properties of compound sections composed of rolled-steel shapes, there are several values that it is necessary to know, and they are the moment-of-inertia of the rolled section and the distance from their outside fibres to the neutral axis. These values can be figured by the methods and formulas given, or they may be obtained from the tables printed by the several steel mills and issued in the form of a handbook to their patrons.

In making the calculations for the section shown in Figure 5 it will be noticed that the distance c for the angles had to be obtained in order to obtain the distance d used in the preceding calculation, and also that the moment-of-inertia for each section, or i, appears in the notation of the calculation.

The following tables, which are compiled from the "*Passaic Rolling Mills Pocket Book*," give the values used in the calculation, and will be found useful in determining the properties of any compound section composed of angles or plate, and in the design of any structure which will be treated of hereafter:

MOMENT-OF-INERTIA OF RECTANGULAR SECTIONS. — AXIS AT RIGHT-ANGLES TO GREATEST DIMENSION OF SECTION.

Depth in inches.	Width of rectangle in inches.						
	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
6	4.50	6.75	9.00	11.25	13.50	15.75	18.00
7	7.15	10.72	14.29	17.86	21.44	25 01	28.58
8	10.67	16.00	21.33	26.67	32.00	37.33	42.67
9	15.19	22.78	30.38	37.97	45.56	53.16	60.75
10	20 83	31.25	41.67	52.08	62 50	72.92	83.33
11	27.73	41.59	55.46	69.32	83.18	97.06	110.92
12	36.00	54.00	72.00	90.00	108.00	126 00	144.00
13	45 77	68.66	91.54	114.43	137.31	160.20	183 08
14	57.17	85.75	114.33	142.92	171.50	200.08	228.67
15	70.31	105.47	140.63	175.78	210.94	246.09	281.25
16	85.33	128.00	170.67	213.33	256.00	298.67	341.33
17	102.35	153.53	204.71	255.89	307 06	358.24	409.42
18	121.50	183 25	243 00	303 75	364.50	428 25	486.00
19	142.90	214 34	285.79	357.24	428.68	500.14	571.58
20	166.67	250.00	333.33	416 67	500 00	583 33	666.67
21	192.94	289.41	385.88	482.34	578.81	675.28	771.75
22	221.83	332 75	443.67	554.58	665.50	776 42	887.33
23	253.48	380.22	506.96	633.70	760.44	887.18	1,013.92
24	288.00	432 00	576 00	720.00	864.00	1,008.00	1,152 00
25	325.52	488.28	651.04	813.80	976.56	1,139.32	1,302.08
26	366.17	549.25	732.33	915 42	1,098 50	1,281.58	1,464.67
27	410 06	615.09	820.13	1,025.16	1,230.19	1,435.22	1,640.25
28	457.33	686.00	914.67	1,143 33	1,372.00	1,600.67	1,829.33
29	508 10	762.16	1,016.21	1,270.26	1,524.31	1,778.36	2,032.42
30	562.50	843.75	1,125.00	1,406 25	1,687.50	1,968.75	2,250.00
31	620.65	930.97	1,241.30	1,551.62	1,861 94	2,172.26	2,482.60
32	682.67	1,024.00	1,365.33	1,706.67	2,048.00	2,389.33	2,730.67
33	748.69	1,123 03	1,497.38	1,871.72	2,246.06	2,620.40	2,994.76
34	818.83	1,228.25	1,637.67	2,047 08	2,456.50	2,865.92	3,275.33
35	893.23	1,339.84	1,786.46	2,233.07	2,679.68	3,126.30	3,572.92
36	972.00	1,458.00	1,944.00	2,430.00	2,916.00	3,402.00	3,888.00
37	1,055 27	1,582 90	2,110.54	2,638 17	3,165.80	3,693.44	4,221.08
38	1,143.17	1,714.75	2,286.33	2,857.92	3,429.50	4,001.08	4,572.67
39	1,235.81	1,853.72	2,471 62	3,089 53	3,707.44	4,325.34	4,943.24
40	1,333.33	2,000 00	2,666.67	3,333.33	4,000.00	4,666.67	6,333.33

PROPERTIES OF ANGLES WITH EQUAL LEGS. — VALUES GIVEN FOR MAXIMUM AND MINIMUM SECTIONS.

Size of angle.	Thickness.	Weight per foot.	Area of section.	Distance from the neutral axis to the back of flange.	Moment-of-inertia, axis parallel to flange.	Section Modulus, axis parallel to flange.	Radius of Gyration, axis parallel to flange.	Radius of Gyration, axis parallel to flange.
					I	Q	r	r'
6 ×6	$\frac{7}{8}$	34.0	10.03	1 87	35.3	8.17	1.87	1.20
6 ×6	$\frac{5}{8}$	14 8	4.36	1.64	15.4	3.52	1.88	1.20
5 ×5	$\frac{7}{8}$	24.2	7.11	1.56	17.0	4.78	1.55	1.00
5 ×5	$\frac{5}{8}$	12.3	3.61	1 39	8.74	2.42	1.56	1.00
4 ×4	$\frac{13}{16}$	20.8	6.11	1.35	9.45	3.32	1.24	.80
4 ×4	$\frac{5}{16}$	8.16	2 40	1.12	3.72	1.29	1.24	.80
$3\frac{1}{2}\times3\frac{1}{2}$	$\frac{5}{8}$	13.5	3.98	1.10	4.33	1.81	1.04	.70
$3\frac{1}{2}\times3\frac{1}{2}$	$\frac{5}{16}$	7.11	2.09	.99	2.45	.98	1.08	.70
3 ×3	$\frac{5}{8}$	12.1	3.56	1.03	3.20	1.48	.94	.60
3 ×3	$\frac{1}{4}$	4.9	1.44	.84	1.24	.58	.93	.60
$2\frac{1}{2}\times2\frac{1}{2}$	$\frac{1}{2}$	7.85	2.31	.82	1.33	.76	.76	.50
$2\frac{1}{2}\times2\frac{1}{2}$	$\frac{1}{4}$	4.05	1.19	.72	.70	.40	.77	.50
$2\frac{1}{4}\times2\frac{1}{4}$	$\frac{1}{2}$	7.17	2.11	.78	1.04	.65	.70	.45
$2\frac{1}{4}\times2\frac{1}{4}$	$\frac{3}{16}$	2.75	.81	.63	.39	.24	.69	.45
2 ×2	$\frac{1}{2}$	6.32	1.86	.72	.72	.51	.62	.40
2 ×2	$\frac{3}{16}$	2.41	.71	.57	.28	.19	.62	.40
$1\frac{3}{4}\times1\frac{3}{4}$	$\frac{7}{16}$	4.72	1.39	.61	.39	.32	.52	.35
$1\frac{3}{4}\times1\frac{3}{4}$	$\frac{3}{16}$	2 11	.62	.51	.18	.14	.54	.35
$1\frac{1}{2}\times1\frac{1}{2}$	$\frac{3}{8}$	3 33	.98	.51	.19	.19	.44	.30
$1\frac{1}{2}\times1\frac{1}{2}$	$\frac{3}{16}$	1.80	.53	.44	.11	.104	.46	.30
$1\frac{1}{2}\times1\frac{1}{4}$	$\frac{5}{16}$	2 55	.75	.46	.123	.134	.40	.25
$1\frac{1}{4}\times1\frac{1}{4}$	$\frac{1}{8}$	1.02	.30	.35	.044	.049	.38	.25
1 ×1	$\frac{1}{4}$	1.57	.46	.36	.045	.064	.31	.20
1 ×1	$\frac{1}{8}$	.78	.23	.30	.022	.031	.31	.20
$\frac{7}{8}\times\frac{7}{8}$	$\frac{3}{16}$	.99	.29	.29	.019	.033	.26	.175
$\frac{7}{8}\times\frac{7}{8}$	$\frac{1}{8}$	.68	.20	.25	.014	.022	.27	.175

PROPERTIES OF ANGLES WITH UNEQUAL LEGS. — VALUES GIVEN FOR MAXIMUM AND MINIMUM. — SECTIONS.

Size of angle.	Thickness.	Weight per foot.	Area of section.	Neutral axis parallel to shorter flange.				Neutral axis parallel to longer flange.				Least Radius of Gyration, axis diagonal.
				Distance from the neutral axis to the back of flange.	Moment-of-inertia.	Section Modulus.	Radius of Gyration.	Distance from the neutral axis to the back of flange.	Moment-of-inertia.	Section Modulus.	Radius of Gyration.	
6 ×4	$\frac{7}{8}$	28.4	8.34	2.20	31.84	7.89	1.95	1.18	11 81	3.85	1.19	.98
6 ×4	$\frac{5}{8}$	12.3	3.61	1.94	13.51	3.32	1.93	.94	4.90	1.60	1.17	.92
5 ×$3\frac{1}{2}$	$\frac{3}{4}$	20.3	5.98	1.78	15.15	4.53	1.59	1.03	6.23	2.39	1.01	.82
5 ×$3\frac{1}{2}$	$\frac{5}{8}$	10.4	3.05	1.61	7.78	2.29	1.60	.86	3.18	1.21	1.02	.76
5 ×3	$\frac{5}{8}$	19.3	5.68	1.90	14.91	4.55	1.62	.88	4.27	1.85	.86	.73
5 ×3	$\frac{5}{16}$	8.16	2 40	1.68	6.26	1.89	1.61	.68	1.75	.75	.85	.71
$4\frac{1}{2}\times3$	$\frac{3}{4}$	17.8	5.23	1.65	10.73	3.59	1 43	.91	3.80	1.75	.86	.72
$4\frac{1}{2}\times3$	$\frac{5}{16}$	7.65	2.25	1.47	4.67	1.54	1.45	.72	1.70	.75	.87	.69
4 ×$3\frac{1}{2}$	$\frac{3}{4}$	17 8	5.23	1.37	8.12	2 95	1.24	1.12	5.83	2.33	1.05	.76
4 ×$3\frac{1}{2}$	$\frac{5}{16}$	7.65	2.25	1.18	3.56	1.24	1.26	.93	2.55	.99	1.07	.73
4 ×3	$\frac{5}{8}$	13.5	3.98	1.37	6.04	2.31	1.23	.87	2.73	1.28	.83	.66
4 ×3	$\frac{5}{16}$	7.11	2.09	1.26	3.38	1.23	1.27	.76	1.65	.74	.89	.65

Every practical consideration in connection with the properties of sections has been explained, except the graphical method of determining the moment-of-inertia. The principle of the method is the same as that to determine the neutral axis, and consists of dividing the area of the figure included between the points J, n, p, q, r, s, as shown in Figure 3, by the total area of the section of the member.

M. M. Sloan.

[To be continued.]

THE PALACE OF THE QUEEN MOTHER, ROME.

AMONG the many buildings torn down in the improvement of Rome was the palace of Prince Buoncompagni-Piombino, which was removed for the enlargement of the Piazza Colonna.

The need of a new family residence led to the erection of this entirely modern palace, which was built under the direction of the designing architect, Gaetano Koch, who, on this occasion, has shown his great merit as designer and artist, and has erected a palace which compares most favorably with the older Roman palaces, from which he has drawn his inspiration, and one well befitting a princely residence.

Situated on the higher level of the Quirinal Hill, on the site of the Villa Ludovisi, it is surrounded by its extensive and lovely gardens containing two villas, one of recent construction, erected by Koch. The palace is artistically placed at the curve of Via Veneto, a large, handsome road leading up from the Piazza Barberini to the gardens of the Villa Borghese, and, while it commands a fine outlook, it also presents itself to the view in a most advantageous and striking manner.

The facade is in the sixteenth-century style and recalls to mind the Farnese Palace: in the centre is the main entrance, composed of three large arches which permit the passage of carriages into the spacious *atrio;* from this access is had to the vestibule leading to the grand stairway, which has been made a chief feature in the building, and here Koch has freely indulged his artistic feeling; at the foot of this stairway he has placed the well-known group by Bernini, "Il Ratto di Proserpina."

This statue formed a part of the Ludovisi Museum, formerly held in the Villa Ludovisi. The Palazzo Piombino, which took its place, was constructed not merely for a residence, but also to receive this valuable collection belonging to the family Buoncompagni-Piombino, and nothing was spared to give these precious works of art a worthy setting.

Koch, in his arrangement of the grand stairway and the connecting gallery, has fully complied with the requirements. This gallery of imposing proportions runs along the rear of the ball-room, dining-room, drawing-room, and bedrooms, which occupy the entire front of the second floor, and gives access to the same. In the decoration of the gallery he has made use of the handsome marbles, columns, tapestries and paintings of the Villa Ludovisi, and has most artfully combined these with the modern decorations.

After the assassination of Humbert I, the Queen left the royal palace of the Quirinal, but desiring to continue her residence in Rome. After diligent search the Palazzo Piombino was found to be the best adapted for a royal residence, and the whole property was purchased by the House of Savoy for an approximate sum of $600,000. Queen Margherita has occupied it since December, 1900; her private apartment consists of five rooms on the second floor contiguous to the large salon in the centre.

The two villas, which were intended as residences for the children of Prince Piombino, are now destined for the use of the members of the immediate family of Queen Margherita during their presence at Rome. No changes were made in the buildings beyond necessary internal renovations, but the valuable collections contained in the palace has been purchased by the Government and will be removed to the National Museum in Rome, where they may be admired by the public, for whom they have been always inaccessible.

This palace, under the auspices of Queen Margherita, will become a centre for the encouragement of art, literature and charity; it is especially in charities that the Queen Dowager interests herself, and recently she purchased a near-lying bit of property which has been converted into an asylum for children whose fathers have met with violent death; this is being connected by means of an underground passage with the palace and will be under the personal supervision of Queen Margherita. Thus, surrounding herself with charitable works, this unfortunate Queen has formed for herself, in the palace that we have described, a peaceful abode, where in seeking to alleviate the misfortunes of others she may find consolation for her own great sorrow.

JAMES GILMORE.

COMMON CAUSES OF FIRES.

SPEAKING of the fires which occurred in this country in 1900, an insurance paper, *The Chronicle*, recently made two striking statements. Very nearly half of them — 46.24 per cent, to be exact — were in dwellings, and 90 per cent of these were due to preventable causes. Almost the only unavoidable fires are those resulting from being situated next to another building which is ablaze. Practically everything else in the way of a conflagration *The Chronicle* attributes to some form of carelessness.

The defective flue is credited with making more mischief than any other one cause. Soot accumulates there by degrees without doing harm until peculiar conditions of draught, attended by chemical changes, perhaps, set the chimney on fire. If the flue is properly built no harm will ensue, but bad construction is liable to be followed by disaster at such times. Whether one rents or buys a house in which stoves, ranges, grates and furnaces are to be used, he should have his chimneys inspected by a competent and disinterested builder, to make sure that they are as they should be. *The Chronicle* insists that they should be of the best brick, preferably double-walled, or else lined with terra-cotta or fire-clay. The very best mortar should be used, and the bricks painted inside as well as out. This is better than plastering the whole inner surface, because smoke tends to disintegrate the coating. The slightest perforation in the chimney is likely to enable a spark to escape, or at least to invite the lodgment of soot.

A chimney ought to rest on the ground or have six courses of brick at the bottom in case it is supported by a timber foundation. A flue should never be so built on joists that a stove-pipe can enter it vertically. Cement or vitrified pipes ought not to be used as flues, and no woodwork should be allowed to come within 2 inches of the chimney.

In erecting stove-pipe, each joint should open back toward the stove. In that way the escape of sparks into the room will be prevented. Pipe should be inspected occasionally to see whether moisture has corroded it. When it passes through a ceiling or floor, it should be surrounded by a double-walled tin collar, with at least an inch of space between the two sheets of metal, and the collar should be of ample length. Unused stove-pipe holes in a chimney should be stopped with metal.

One of the most incendiary combinations against the welfare of a household is that effected by the average child and a match. Insurance-men are constantly advising the use of safety-matches alone, and the habit of keeping even these out of the hands of youngsters is strongly commended. Inasmuch as the life of the little ones is hazarded by too great license in this respect, the rule cannot be enforced too rigidly.

Gas-jets, when near woodwork or curtains, are a constant source of danger. Glass chimneys or globes afford a little protection, but a wire cage is much better. And if one is not willing to employ this, he would do well to adopt a fixture which cannot swing so as to come in contact with draperies. It is also necessary to guard against the possibility of a puff of wind catching a curtain and blowing it against the jet. Many fatal fires have thus been caused. At least 20 inches of space should intervene between a gas-jet and a lath-and-plaster ceiling. Otherwise there should be a metal screen, itself fully an inch from the ceiling.

There are people ignorant or careless enough to-day to need warning not to fill or trim kerosene lamps at night. A still larger proportion of the population is unaware of the risk of letting the oil get very low in the reservoir and of turning the wick down without entirely extinguishing the flame. The former practice is conducive to the generation of explosive gases in the lamp, and the latter overheats the burner. Of course, so long as one consumes high-grade oil he is safe, even under these circumstances. But where low-grade oils are burned there is a chance that the naphtha or gasolene which they contain will make trouble. The same precautions should be observed with oil-stoves as oil-lamps.

Regarding the furnace, *The Chronicle* offers the following suggestions: —

Place it on a solid foundation of brick or stone. Have stone, brick or metal not less than 36 inches wide in front of the ash-pit. The dome of the furnace should not be less than 18 inches from the unprotected woodwork above. The smoke-pipe should not be less than 12 and the hot-air flues not less than 8 or 10 inches from the side walls of combustible material. The hot-air flues should be constructed of IX bright tin, and they should be double where they pass through wood or lath-and-plaster materials. There should be an air-space of at least $\frac{1}{2}$ inch between the inner and outer flues. Set the register in soapstone frames not less than 2 inches wide and well bedded in plaster-of-Paris. Make register-boxes of IX bright tin, if they pass through floors. Have the joist and floor timbers framed around them so as to leave an air-space from 2 to 3 inches wide, and cover the exposed woodwork with tin on all sides.

Use a metal air-trunk or inlet, with a wire net or grating at its outer opening. Wooden air-trunks are exceedingly dangerous, for at some time a reversal of the draught is likely to occur and carry sparks into the wooden shaft. Have an expert inspect your furnace before lighting and see that the lining has not been burned through. Keep at least one of the registers open all the time.

THE ACTION OF WIND AND WATER ON SEA-CLIFFS.

BY the sea precipices of the West the foam-fringe and the winds are the greatest of all natural forces. These Atlantic winds, wave-compelling, rock-destroying, drive the hosts of ocean, rank behind rank, to the onset, and search from foot to crest each face and crevice of the towering cliffs. The foam and surge, the bondslaves of the winds, the heavy and light artillery of the ocean bands, are the visible agents of destruction, and on the Cornish coast develop a power so awful, with a display of form and motion so sublime, that the imagination could never picture one-half of the volume and immensity of the forces of the air and deep. When the southerly gales come tearing across the Atlantic, up the mouth of the Channel, they rush into Mount's Bay, and, spinning round as in a caldron, beaten and resilient from headland to headland, make their last and fiercest onset on the serpentine walls of the Lizard Peninsula. From Poldhu and Mullion, over to the Lizard lights, is the climax of the struggle between the forces of earth and air, the rocks and tempests, in which the sea intervenes as the willing and mighty ally of the kingdom of the winds. It is a battle of armies in position, a set-piece of natural combat, in which the meeting of the hosts is veiled in mist and smoke and spoutings, and earth and sky re-echo the thunder of their war. The fighting-line is the foam-fringe, which

comes into action then, as we watch it from one of the black projecting towers of serpentine which guard some deep cove in the Lizard front. From the blue deep of the bay, under scuds of storm-wrack and shafts of light, the waves advance with a frontage of miles, blue rank behind blue rank, and ever rising and sharpening towards their summits. The front ranks pass by the watch-tower, bursting invisibly on the left where the buttress projects, but the right mile of wave has not yet hit the coast. Part does, smiting the heads of the cliffs in succession and exploding like mines in smoke and spray; part rushes on in the cove below till we see the back of the waves, green and translucent, as wrecked sailors do, rising between us and the shore, till the billow rises, curls over like a scroll, and then pours forward the rolling fields of foam. The whole frontage of the bay holds nothing but this sea-froth, into which the jade-green, sun-pierced mountains of water are ever pouring fresh floods from ocean's store. Acres and acres of foam lie weltering there, some dashing 100 feet over the squared, black, yellow-stained cliffs, some eddying round or falling back on the sands of the cove, some following the spin of the waters round and floating on half-seen solid sea, lapis-blue or green. This welter of the sea divides into three forms: the solid sea water; the white water, which is sea and air mixed by the toppling of the wave or its explosion on the rocks and precipices; and the true foam, which is made of sea-bubbles stuck together like a lump of skates' eggs, and often detaches into masses like sponges, large and small, and floats inland in such flights and incessant driftings as to form a separate and peculiar feature of the fringe of these Cornish precipices.

The spray, which dashes over the cliff-faces when unbroken waves hit the rocks, is solid water finely divided, wetting and stinging, and destroying or blighting even the hardy vegetation of this strange and awful coast. From the top of Gue Graze, near Kynance, and on the cliffs adjoining, the forms and force of foam may be seen as at a "private view," for no one is there to share the sight but the ravens and the falcon on the cliffs. Across the inlet is a wall of black serpentine, 300 feet high, veined with invisible green, and patched with orange below where the spray does not fall. The serpentine wall stands upright, above a black cavern, Ogo Pons ("ogo" means "cave" in old Cornish), bored out by the Atlantic waves. Above, the serpentine is capped with short turf and Cornish heather and thrift. The whole cove or bay is one inlet of green foam-edged, bellying surge, dipping, heaving, swelling, contracting and expanding, with the rolling froth eddying this way and that, and smashed and drowned at regular pulsations by the green and white outpouring waves from the main ocean. As these roll in like minute-guns their right flank hits the projecting cliff before they break, and as from a cannon's mouth the smoking spray rises in a column wide and high as a cathedral tower. From base to summit this column of spray ever drenches the cliff, and keeps it wet, black and bare. It curls over the summit, and throws itself, widened and wind-borne, on the turf mantle at the top, and as the spray of a fresh fountain makes all the grass green within the spread of its refreshing dew, so the pillar of salt spray has turned all the acres of grass on which it falls into a tawny brown and bronze. This spray is violently thrown; it does not float upwards; but the winds here help to carve the rock, even as the sand-grains carve the crags round the Sahara desert. Vexed by the spray, baked by the heat, and frozen in winter cold, the marble-like face of the serpentine cliffs cracks at first into square blocks, whose sheltered sides are slowly overgrown by an exquisite bloom of grays, and powdery yellows, and green lichenous dust, like pastel smoothed on a dark gray ground. These split and split again, and are then carried in tiny squares to the top of the cliffs by the wind. For the wind plays strange tricks as it strikes the cliff-face from the open sea. In a forty-mile gale blowing straight from the ocean you may stand on the cliff edge, if at a height of over 200 feet from the water, almost in a calm. This is one of the mysteries of this home of the wind and foam, and is explained thus: —

All the wind-force which strikes the cliff-face rushes upwards, perpendicularly with the face of the precipice, and with greater violence than the horizontal force which strikes the air above the summit. Thus the vertical ascending wind acts as a screen from the horizontal blast, and the watcher on the cliff is shielded from one blast behind the protection of the other. It is on this upward blast that the seagulls float in gales close to the cliff-face. It also scrapes off and carries upward from the serpentine little loosened cubes of the rock, green and dark azure, and streaked with bloody red where it is fresh broken, and lifting these above the cliff-top, drops them on the flat summit when the horizontal blast overpowers the ascending one. The turf is strewn with these little chips of the wind's undoing. Against lower cliff-faces the course of the wind is more wilful. The foam-flakes trace its currents and mark in their slow and devious flight the course and winding of these wandering winds. In Dollar Cove, a low-browed circular niche in the black coast, some thirty yards across, with a cave under the eastern side, the towering waves rolled before an ocean breeze on the ebb tide and piled masses of sea-froth, brewing like wort, 4 feet deep on the strip of sand which lay at the feet of the rock-face. Into the cove and against the shore, the wind blew steadily, and flakes and masses of the froth, of all sizes, from that of an apple to the rope fender of a coaster, detached themselves from the mass, rose, and followed the course of the wind. There were four main currents, each as clearly marked by the successive and slow travel of the froth masses in air as is the current of boiling water by the sawdust in a chemist's flask. Some rose on either side of the little horseshoe of rock, travelled slowly up the face of the cliff, and then moved off right and left inland along two depressions in the down above, where they made a long trail of slowly expiring bubble masses. Others, when they reached a point to the right or left of these ascending winds, turned backwards in a curve, followed the horseshoe towards the outer edges, and then curled back over the sea, following in the air almost exactly the same course as the refluent waters were taking below. This cove is possibly named from a Dutch brig, the "*Dollard*," laden with wheat, from Trieste for Falmouth, in 1862. One of the crew saved himself by jumping on to a rock and climbing the cliff. The captain, his son and four seamen perished, and the ship went to pieces in ten minutes. But a month later, at low water, some fishermen made their way into the cave, or "ogo," the bottom of which is always awash, and there found parts of the masts and spars of the "*Dollard*," which had been churned about in this subterranean cavern ever since the wreck. — *The Spectator.*

BOOKS AND PAPERS

MR. ALFRED WHITMAN'S new book[1] upon engravings deserves notice for two reasons — because such a book is eminently useful to collectors and would-be ones, and because being an official in the Department of Prints and Drawings in the British Museum, he speaks authoritatively and with knowledge — two qualities which do not always go together. The book explains the various kinds of engravings — mezzotints, etchings, line, stipple, printing in color, aquatint, woodcuts and lithographs. The illustrations are some eighty in number, mostly by the half-tone process, but, in order to show the different styles of technique of the originals, some of them are reproduced in collotype — a distinct advantage. Etchings reproduce line for line, but line-engravings and mezzotints lose their especial technique by the half-tone process, the screen used destroying the texture of the original work, or, rather, it adds another texture to it.

Mr. Whitman gives a chapter upon each branch of engraving, and, incidentally, upon the various frauds indulged in by dishonest dealers of former times and of the present day, and so instructs collectors as to the rocks to be avoided. He also gives a chapter upon prices attained in these latter days. Fashion and fads, of course, rule the collection of prints as of other things worth collecting, but the prices which colored prints (printed in colors) have fetched in London lately seem exorbitant, and Mr. Whitman points out that an amateur may make a very good collection of engravings at small cost, if he be content with good specimens, but of less popular subjects. Thus, although a Rembrandt etching (the "Rembrandt with the Sabre") fetched £2,000 at the Holford Sale, an amateur known to the author picked up some genuine and very good ones at old shops for 6*d.* apiece! These are the prizes which are sometimes obtained by those who poke into dirty portfolios in squalid shops. Fine French line-engravings may be bought reasonably now — they are not in fashion; whereas, if you want mezzotints after Reynolds, you must bring a heavy purse. In the one case two figures may be enough; in the other, the price may rise even to four figures.

Morland's colored prints fetch large sums: they are the fashion; but it is a fashion which will probably decline. His pictures of animals are, of course, worth the prices they fetch, but the transcriptions printed in colors of his figure-subjects are very inferior.

As in books, so in prints, the least thing will enhance or diminish value. A first edition of "*Martin Chuzzlewit*" with the hundred pounds on the title-page printed thus, "100£," is of much value; but the later first editions where the correction appears as "£100" is of next to none. So the "Portrait of Ephraim Bonus" etched by Rembrandt with a black ring, sold in 1893 for £1,950; whereas at the same sale (Holford), an impression in the second state, with a white ring, went for only £135. This makes the difference; as it is known that only three impressions of the former are known, all the others are of the second state. As of these three impressions in the first state one is permanently preserved at Amsterdam, while the second is in the British Museum, the Holford impression, as in the case of the "Rembrandt with the Sabre" was the only one that could possibly ever come into the market.

A reproduction of "La Rue Transnonian," lithographed by Honoré Daumier, shows that artist in all his dramatic force.

Mr. Whitman has hit upon a very useful idea in reproducing a portion of some of the prints enlarged three times. It is always difficult to describe art techniques, but by these examples we see at once, say, the effect of the "rocking" process upon a mezzotint ground; if we could have had a photograph of the "rocker" we should have had still less difficulty in understanding this particular process.

The description of the vicissitudes of an equestrian portrait of Charles I. by Vandyke are strange. It is in line and has passed through five stages. No. 1 is without a head. No. 2 has an etched head of a wigged and moustachless gentleman, which might be Marlborough or William III. No. 3 is Cromwell. In No. 4 Charles re-appears, and in No. 5 we see old Oliver resuscitated! The erasures round the heads are quite plain, and speak of the popularity

[1] "*The Print-Collector's Hand-book.*" By Alfred Whitman. London: Bell & Son. 1901. 15*s.*

and unpopularity of the two persons. As the pendulum moved toward monarchy or democracy, so this copper-plate was placed under the hands of the engraver to bring the head up to date (!) in representing alternately the King and the Lord Protector.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES POST-OFFICE AND COURT-HOUSE, FREEPORT, ILL. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

ADDITIONS TO HOUSE OF E. W. CLARK, ESQ., CHESTNUT HILL, PHILADELPHIA, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

CORRIDOR: PALAZZO MARGHERITA, ROME, ITALY. SIG. GAETANO KOCH, ARCHITECT.

THE KUNSTLERHAUS, MUNICH, BAVARIA: GALLERY IN THE BANQUET-HALL; — THE MAIN STAIRCASE. HERR GABRIEL SEIDL, ARCHITECT.

THIS and the following plate are copied from *Deutsche Bauzeitung*.

DETAILS OF THE BANQUET-HALL: DAS KUNSTLERHAUS, MUNICH, BAVARIA. HERR GABRIEL SEIDL, ARCHITECT.

[The following named illustration may be found by reference to our advertising pages.]

MONUMENT TO CHARLES MATHIEU, LOURCHES, NORD, FRANCE. C. MOYAUX, ARCHITECT. C. THEUNISSEN, SCULPTOR.

THIS plate is copied from *l'Architecture*.

[Additional illustrations in the International Edition.]

ENTRANCE: NO. 411 COMMONWEALTH AVE., BOSTON, MASS. MESSRS. LITTLE & BROWNE, ARCHITECTS, BOSTON, MASS.

THE PALAZZO MARGHERITA, FORMERLY PIOMBINO, ROME, ITALY. SIG. GAETANO KOCH, ARCHITECT.

FOR description see article "The Palace of the Queen Mother" elsewhere in this issue.

MAIN STAIRCASE IN THE SAME PALACE.

HOUSE OF MRS. CATHERINE MINOT. MESSRS. PEABODY & STEARNS, ARCHITECTS; — HOUSE OF ROBERT S. BRADLEY, ESQ. MESSRS. LITTLE & BROWN, ARCHITECTS, BOSTON, MASS.

"THE AMALIENBURG," MUNICH, BAVARIA.

NOTES & CLIPPINGS

THE PROPER POLICY FOR PICTURE-GALLERIES. — Mr. Claude Phillips is up in arms over the latest manifestations of that curious method which is followed by the authorities of the National Gallery in adding to its possessions. A huge altar-piece by Signorelli has been bought for Trafalgar Square from the Mancini Collection at Citta di Castello. Although it is authentic, the critic argues that it is far from being a worthy example, and that as Signorelli is already adequately represented in the National Gallery, this immense painting is undesirable whether the price paid for it was a high or a low one. He pertinently advances the idea that it is better for the authorities to hoard their money and wait for first-rate opportunities than to buy superfluous works like this, especially as the outlook in the picture-market is well calculated to make possible purchasers put themselves in readiness to spend freely. "The wave of disintegration is again passing over England," says Mr. Phillips, "and the many who look upon the possession of great and epoch-making works of art as one of the national glories must tremble when they remember the breaking up in comparatively recent times of the famous Blenheim, Dudley, Ashburnham and Francis Hope collections, and the partial dispersal of one of the most interesting of all — that of the Earl of Northbrook. Transatlantic capital batters in now, by sheer force of metal, such few doors as are not thrown wide open to meet it half way. Among the collections which have already suffered from its seemingly irresistible encroachments — and may, therefore, suffer more in the future — are those of Castle Howard, Cobham, Warwick Castle, Kingston Lacy, and, alas! even that of Dorchester House, which, as one of the finest and best-chosen private galleries in the Kingdom, every one must honestly desire to see maintained intact, or, if it should come to the worst, handed over intact to the nation." The National Gallery has long suffered from the short-sighted policy to which Mr. Phillips refers. Either through the bad judgment of the Director, through the disagreements of Trustees, or through the lack of funds which should easily have been procured from private sources when Government grants were unavailable, good pictures have been allowed to pass into the hands of foreign buyers, and the sense of loss has been aggravated among outside observers by expenditures as ill advised as the one to which specific exception has just been taken. There were groans in London last summer when the chance to buy a fine Hals was missed. The Continental museums are better off. The directors in Amsterdam, Berlin, Paris, Vienna, and Munich are kept so well informed that they or their representatives are promptly on the scene whenever there is a chance of acquiring a valuable work of art; and, somehow, they seem able to raise funds enough to make them formidable competitors when the sale comes off. There is a lesson here for us. The Metropolitan Museum is receiving every year more and more generous support, and, indeed, the recent Rogers bequest is one to excite envy among the directors of art-museums all the world over. But it is important that the Metropolitan should be kept constantly supplied with a really large sum in cash for the purchase of such works as may come into the market, and that it should be represented abroad by agents on whom the Director and Trustees might rely for early and absolutely trustworthy information and for that discretion in the making of purchases which is as necessary as the money itself. — *N. Y. Tribune.*

PARMA, THE CITY OF THE FARNESI. — On almost every Italian town, whatever succession of masters it may have known, some one family has left its dominant mark, and Parma is distinctively the city of the Farnesi. Late-comers though they were, their lilies are everywhere, over gateways, on palace-fronts, and in the aisles of churches; and they have bequeathed to the town a number of its most characteristic buildings from the immense unfinished Palazzo della Pilotta to the baroque fountain of parti colored marbles which enlivens, with its graceful nymphs and river-gods, the grassy solitude of the palace square. To Rannuccio I, the greatest of these ducal builders, Parma owes the gigantic project of the Pilotta, as well as the Farnese Theatre and the University. To this group Duke Ottavio, at a later date, added the charming "Little Palace of the Garden." . . . The Farnese Theatre is one of those brilliant improvisations in wood and plaster to which Italian artists were trained by centuries of hurriedly organized *trionfi*, state processions, religious festivals, returns from war, all demanding the collaboration of sculptor, architect, and painter in rapid evocation of triumphal arches, architectural perspectives, statuary, chariots, flights of angels, and galleons tossing on simulated seas: evanescent visions of some *pays bleu* of Boiardo or of Ariosto, destined to crumble the next day like the palace of an evil enchanter. To those who admire the peculiarly Italian gift of spontaneous plastic invention, the art of the *plasticatore*, to borrow an untranslatable term, such buildings are of peculiar interest, since, owing to the nature of their construction, so few have survived; and of these probably none is as well preserved as Aleotti's Theatre. It is true that the painted ceiling is gone, and that the splendid Farnese dukes bestriding their chargers in lofty niches on each side of the proscenium are beginning to show their wooden anatomy through the wounds in their plaster sides; but the fine composition of the auditorium, and the Olympus of plaster divinities peopling the niches and balustrades and poised above the arch of the proscenium, still serve to recall the original splendor of the scene. The dusty gloom of the place suggests some impending transformation, and when fancy has restored to the roof the great glass chandeliers now hanging in the neighboring museum, their light seems to fall once more on boxes draped with crimson velvet and filled with lords and ladies in the sumptuous Spanish habit, while on the stage, before a perspective of fantastic colonnades and terraces, Isabel and Harlequin and the Capitan Spavento, *plasticatori* of another sort, build on the scaffolding of some familiar intrigue the airy superstructure of their wit. — *Edith Wharton in Scribner's Magazine.*

SAFEGUARDING THE CITIZENS' HEALTH. — A recent decision of the Appellate Division (Third Department) of the New York Supreme Court in the case of Margaret Munn *vs.* the City of Hudson (61 App. Div., 3423) holds that where a city allows its sewerage system to get out of repair, the householder whose property is injured can recover damages not only for the injury done to the property, but also to the health of the householder. In some respects this seems an advance on the idea hitherto entertained in New York. In this case the city built its sewer in such a negligent and insufficient manner that after several years' use part of the sewer became filled up, with the result that injury was done to the property and to the health of the householder. The trial resulted in a verdict of $800 for damage done the property and $1,000 for injury to the health of the plaintiff. In sustaining this verdict, the Appellate Court said the facts were such as to have given the city ample notice to repair the sewer. The city argued, however, that, as a matter of law, damages could not be recovered for injuries to health. Replying to this argument the Appellate Court said: "It was the duty of the defendant to use reasonable care in constructing the sewer according to the plans and specifications, and it was also the duty of the defendant to use reasonable care in keeping the sewer in proper repair." Accordingly it followed, the Court held, that "where, by reason of the negligence of a municipality, a trespass is committed upon premises by allowing the contents of a sewer to overflow thereon and a private nuisance is thus created, we see no reason why the owner of the premises cannot recover as damages, not only the injury to the property, but all other damages that are the natural and proximate result of the wrong. The damages must depend upon the proof in each case, and are only limited by the ordinary rules that require that they should not be remote or speculative." This decision, if sustained, may lead to much interesting litigation as to how far cities may be bound to see that householders do not suffer in their health from the negligent failure of cities to keep their sanitary arrangements in order. — *N. Y. Evening Post.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, JANUARY 25, 1902 No. 1361

CONTENTS

SUMMARY: —

The Need of an Assembly-hall in Washington. — An Architect's Right to Commission on Extras. — Opposition to proposed New York Tax on Mortgages. — When is a fully enclosed House not a House? — The Germanic Museum of Harvard University. — More Information concerning the Doings of the American Window Glass Co. — Custom-house Seizures for alleged Undervaluation of Imported Antiquities. 25

THE RECENT EXCAVATIONS NEAR POMPEII. 27

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES. — IV. 28

PARTIAL USE OF THE DECIMAL SYSTEM THIRTY-FIVE YEARS AFTER LEGALIZATION. 29

BOOKS AND PAPERS. 31

ILLUSTRATIONS: —

Entrance to the Equitable Life Assurance Building, Broadway, New York, N. Y. — House of John Caldwell, Esq., Stockbridge, Mass. — Rivaulx Abbey, England; — Itham Moat, England. — Castle Acre Priory, Norfolk, England. "Tigbourne Court," Witley, Eng.

Additional: Banking-house of Edward C. Jones, Philadelphia, Pa. — House of Moorfield Storey, Esq., 24 Fenway, Boston, Mass. — Terrace Gardens, Foots Gray Place, Sidcup, Eng. — Pine-tree Forms as Frieze Decorations. — Terrace and Summer-houses, Dazham Hall, Suffolk, Eng. 31

NOTES AND CLIPPINGS. 32

TOO late in the season to allow us to perfect our plans and make announcement earlier, we determined to make a change in the manner and method of publishing our International edition, and we now give notice that the change impends and will have effect in the second quarter of the year. The change consists simply in gathering the extra illustrations which constitute the International edition into four quarterly issues in place of their being, as now, scattered through thirteen weekly issues. The result will be that the subscriber to the International edition will receive each week a copy of the Regular edition and with each quarter a quarterly volume in which will be collected the gelatine and other International plates. That is, a subscriber will receive exactly what he now receives, but it will reach him in what, we believe, will be a more acceptable and agreeable form. Amongst other advantages incident to this condensation of matter is the fact that it will enable us to publish in the same issue all the plates in illustration of a given building, instead of being forced to let them dribble out, a few at a time, in four or five different weekly issues, as in the past. — *From our issue for Jan. 4.*

THE Commission for beautifying the city of Washington, among the other suggestions which it makes, provides in its plan a suitable place for a large hall, which can be used for exhibitions of various kinds, as well as for the inaugural ball, which occurs every four years, and for other State festivities. The need of something of the kind has really become pressing. State balls or receptions are not infrequent in Washington, and would be more common if there were a place to hold them in, but, unless, as sometimes happens, a temporary shed is built for them, or a tent set up, it is necessary to find room for them in the Pension Office, or some other structure which, to say the least, was never intended for such a purpose, while the preparations for the entertainment interfere very seriously with the work of the branch of the public service whose hospitality is called upon. Some twenty years ago, a ball was to be given in honor of an important assemblage of military men with their families in Washington, and, as nothing better offered, a huge tent was set up for it. The night before the ball the tent was blown down by a furious snowstorm, and the Government, with the never-failing courtesy which is characteristic of Washington, lent the Capitol to the distracted managers of the entertainment. It cannot be said that the sandstone pavement of the Rotunda was particularly favorable to dancing; and, although very few balls have been held in a more dignified room, it would be possible, without great expense, to build a structure large enough to hold the company of an inauguration ball, and, at the same time, beautiful and comfortable, which would be useful in many ways, as for example, for exhibitions of flowers and pictures, patriotic fairs, receptions to distinguished people, and so on. Senator McMillan has already introduced a bill for the erection by the Government of such a structure, and, although there is little probability that Congress will pass the bill, the matter has excited so much interest that a meeting is to be held in Washington on the fifteenth of February to see whether a private corporation cannot be formed to build and maintain a structure of the kind, asking the Government only for the concession of a site on public ground. In view of the many public or semi-public uses to which the building would be put, it is probable that Congress will readily grant this, and it is much to be hoped that the undertaking may be carried out.

A CASE of importance to architects came up recently in the Supreme Court of Indiana. An architect contracted with a public Board of Commissioners to furnish plans and specifications for a certain building, and superintend its erection, for a certain percentage on the cost of the completed building. It was stipulated in his contract that the building should not cost more than a certain sum, and that he should make necessary changes in the plans and specifications without additional expense; and the contract also provided, presumably by implication only, that the architect should pay all loss or damage due to his own mistakes in preparing plans, specifications or contracts, or in superintending the erection of the building. After the original plans and specifications were made, the Commissioners directed changes to be made, which greatly increased the cost of the building, and the architect superintended its execution at the increased cost. The question before the Court, which was decided unfavorably to the architect by the court below, was whether, under his contract, the architect was entitled to a percentage on the extra cost of the building over the sum originally stipulated. The Supreme Court reversed the decision of the lower court, and held that the architect was, under the circumstances, entitled to his percentage on the entire cost of the building as finally completed. The attorneys for the Commissioners thought that it strengthened their case to claim that the contract with the architect was illegal, under a statute forbidding "commission or percentage contracts with State or county officers"; but the Supreme Court held that the case in question was not within that statute.

THE New York builders, with good reason, are endeavoring to prevent the adoption by the Assembly of a bill to tax mortgages, on the ground that, as they are obliged to carry on their business with money mostly borrowed on mortgage, the tax would add greatly to their burdens. The people who vote for laws taxing mortgages often have a vague idea that they are in this way getting money out of the "money-lenders," or the "Shylocks," or whatever else they choose to call them; but, in practice, all mortgages on real-estate contain a clause by which the borrower agrees to pay all the taxes which may be imposed, either on the estate or on the mortgage, and, as no legislation can, under the Constitution, set aside an agreement of this kind, the taxation of the mortgage, independent of its abstract justice, simply increases the burden of the borrower. In the case of builders, who often carry a burden of from fifty to a hundred thousand dollars of mortgage-loans on a capital of a thousand dollars, a tax on the mortgages, which they would have to pay, would soon ruin them. Supposing the mortgages to bear the usual rate of taxation of personal property, which would be, in New York, about two per cent, the additional burden which would be imposed on them every year would be, in many cases, more than their entire capital, and more than the income which they could reasonably hope to derive from their business for the support of their families. In practice, the matter would be worse than this, for, as most builders would be absolutely unable to pay such a tax on their usual amount of borrowed capital, they would soon be overwhelmed with foreclosures, and ruined; while such as held out or passed through bankruptcy would find their operations limited to very meagre proportions by the smallness of the loans on which they could pay interest.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

A CURIOUS and important case has just been decided by the New York Court of Appeals. Some twelve years ago, a block of three apartment-houses was built on three contiguous twenty-five-foot lots in New York by the owner of the three lots, who made the walls between his houses party-walls. Not long ago, one Schaefer contracted to buy one of the lots with the house standing on it. After he had agreed to buy, he learned that the party-wall, for a distance of twenty-seven feet, was entirely on the adjoining lot. He sued the person from whom he had agreed to buy for damages, on the ground that he had not a complete house on the lot in question, since the support of a portion of the beams was on neighboring property. This view was confirmed by the Supreme Court, but the Court of Appeals held a different opinion, saying that the original owner of the three lots, by resting the beams of one of the houses on what was supposed to be a party-wall, but which was really on the adjoining lot, created thereby a servitude on the latter lot, so that Schafer was entitled to rest his beams on the wall in question, as long as it should stand; and, as his house was so much wider in consequence, he was benefited, rather than injured, by the mistake.

THE establishment of a Germanic Museum at Harvard College comes at a very appropriate time. Large as the German population of the United States is, Americans in general know almost nothing of German literature and much less of German art. Even German industry is just beginning to make its way here, and, while many of our merchants and manufacturers have now their regular connections in Berlin, or Elberfeld, or Hamburg, they do not say much about them, and the average citizen, who is occasionally surprised to see a German mark on the stockings, or scissors, or pen-knives that he buys for his family, as being of the best quality obtainable, would be still more surprised to hear that German manufactures are to be found everywhere; that a large proportion of the richest mines, the most important railroads, and the finest steamships in the world belong to Germans, and that the larger manufacturing cities of Germany have, within the past twenty years, surpassed in rapidity of growth anything known, even in this country, outside of a mining camp. This rapid development of Germany has unquestionably been of great benefit to civilization. Independent of the traditions of sober probity which still rule in German business affairs, the intelligence of the Germans in making practical use of the scientific reasoning in which they excel all others has been of incalculable advantage to the world, and there is hardly a household in Europe or America which does not enjoy some comfort which, except for the Germans, would have been beyond its reach.

IT is probable that the industrial capacity of the Germans will through the force of circumstances soon become more familiar to us, but there is a whole world of German sentiment and feeling which, if it were better known, would appeal particularly to Americans. Unfortunately, perhaps, true sentiment does not put itself forward like the commercial spirit, and the friends of German art, by the forms of which German feeling is expressed, must make some effort to bring it to the attention of their kinsmen on this side of the ocean. For such an effort the new Germanic Museum offers an opportunity which will, we hope, not be neglected. It is reported that the Emperor of Germany, who is a sincere admirer of the American character, and earnestly desires a better understanding between the two nations, has interested himself in making a collection of casts and other examples of German art to be presented to the Museum. This would be a very pretty compliment, not only to the Museum and the University, but to the American people; but even if the report should prove to be without foundation, it would still be possible to get together, in the building which the University has set apart for the use of the Museum, a very interesting assortment of objects, illustrating, not only German art and history in general, but their variations, Prussian, Rhenish, Saxon and Bavarian, from Charlemagne down to our own time.

THE poor consumers, who meekly look on while Trust magnates are fighting among themselves, and wonder whether the fray will end in any relaxation of the iron grip of the magnates on prices, will find interest just now in the movements in the glass manufacture. It will be remembered that, not long ago, the American Window Glass Company executed a masterly stroke of policy in making an agreement with the glass-blowers' union, by which the members of the latter, in consideration, it is said, of a large number of shares of the Glass Company's stock, together with other valuable considerations, agreed to work only for the Trust, the latter agreeing on its side to employ only members of the union. As the union comprises only about two-thirds enough men to operate the window-glass factories in the United States, and, practically, refuses to admit any new members, the combination between the monopoly of employers and the monopoly of labor was looked upon for a time as invincible. It appears, however, that a cloud has come over this delightful scene. A window-glass manufactory is not a very costly affair, and from time to time, small parties of glass-blowers, dissatisfied with union methods, have raised a little capital, and entered upon manufacturing for themselves. These small concerns have not until lately been important enough to interfere with the monopoly of the Trust, and, taking advantage of the high prices established by the latter, they have prospered. Now, the aggregate production of all the factories, including those of the Trust and the independent concerns, is greater than the consumption, and it has become a serious question which party shall curtail its operations. Immediately after the alliance between the American Company and the union, the independent concerns found it so difficult to get men that it was reported that all of them were closed, but this state of affairs lasted only a short time, and matters are now as bad as ever. Each party is suspected of designing to make a sudden and great reduction in prices, in order to secure heavy contracts for the next season; but each party evidently fears difficulty in getting men to carry out such contracts as it may secure. The union, apparently foreseeing defections from its ranks in case of the inability of the Trust, which protects it, to control the business, has voted to admit "apprentices," to the amount of ten per cent of its total membership. The object of this proceeding seems to be to make sure of supplying the Trust with the men that it may need, at the same time that the regular union manœuvres are carried on to prevent the outside concerns from getting men. Whether it will succeed remains to be seen; but, meanwhile, it may be observed that no Trust, or combination, or monopoly can long keep up prices of goods which are being manufactured at a rate fifty per cent greater than the consumption. If production can be checked until it equals the demand, prices can be maintained; but, in order to check production, some one must go out of business, and nobody is likely to do that so long as profits are large. The earlier Trusts kept down production by paying the proprietors of competing manufactories to let their establishments lie idle, but this is out of the question in the window-glass manufacture, and the chances seem to be that the contest will, for a time, at least, take the form of a radical cutting of prices.

THE importers of antiquities are having a hard time just now, under the new Custom-house regulation, by which the price actually paid for articles imported from abroad is not regarded in the collection of duties if the examiners in this country think that they were bought too cheap. Boston is, probably, the best market in the world for the sale of miscellaneous bric-à-brac, and two dealers have recently had their importations confiscated for undervaluation, the appraiser, in one case, valuing at two thousand dollars each certain tapestries, smaller, and probably, not very much better, than pieces which have sold for twenty-five dollars or less. Under the Custom-house regulations, if the examiner in this country thinks that imported articles are worth over fifty per cent more than the declared invoice cost, they are absolutely confiscated, and the owner can only obtain them by buying them of the Custom-house at the appraiser's price, in addition to what he may have paid for them originally, or by waiting until the confiscated goods are sold at auction for Government account, and bidding on them. It is hardly necessary to say that, if our Custom-house inspectors were not men of perfect integrity, it would be easy for them to appropriate anything in a tourist's or importer's trunks to which they might take a fancy, by the simple process of rating the value fifty per cent higher than the cost, seizing it, sending it to the Government warehouse, and, at the auction sale, quietly having it bid in by a confederate. In the case of the tapestries, for example, it is incredible that two thousand dollars each should ever be bid for articles of the kind, in connection with the old boots, damaged hides, broken crockery and other staples of Custom-house auctions, and an understanding among the officials might easily throw all the bargains into their hands.

THE RECENT EXCAVATIONS NEAR POMPEII.

NEAR Pompeii, just now, they are exhuming invaluable relics which belong, probably, to some faubourg of that lovable, but unfortunate, town. These excavations are being made about a kilometre from the walls and at 200 metres from the mouth of the Sarno. After removing a layer of half-sedimentary and half-volcanic deposit, they have come upon an old portico, with the remains of travellers and visitors who had sought refuge there.

In accordance with some of the indications, and, perhaps, after a last effort of imagination, some have asserted that it must be granted that there were recognized amongst the bodies discovered the *familia* of Pliny the Elder, Pliny himself being present in the guise of one of the bodies most richly clothed and evidently that of the most important personage. But this is, doubtless, only a very audacious hypothesis put forth by a fertile poetic imagination impressed by certain historic reminiscences. It is far more prudent to feel that we are in the presence of the relics of a band of fugitive Pompeians whom the cataclysm overwhelmed at the place where the excavation brings them to light.

It is almost beyond doubt that the body of the great naturalist of antiquity was neither abandoned nor forgotten in the disaster. They found it the next day, when the incandescent showers had ceased, when the black clouds of mephitic vapor no longer rolled over the shores of Campania, and, in the celebrated letter which Pliny the Younger addresses to Tacitus, he says that they found "*corpus integrum, inlæsum, opertum ut fuerat indutus*," and expresses himself in terms which prove that his uncle was not buried in a shroud of lava, as were so great a number of his compatriots. He supposed, even, that he died of asphyxiation, since his body showed no sign of agony, but was calm and serene, without any contractions of suffering or tragic agony, and was still, according to his nephew, "*habitus corporis quiescenti quam defuncto similior*."

However this may be, it will not be easy to determine the condition and the names of the unfortunates overwhelmed between the Sarno, a little stream of Campania, and the sea, burned by the incandescent mud of Vesuvius, blinded by ashes and exhausted by heat, at the very moment when they were about to secure their safety through embarking on a galley which would have transported them into the open sea. But one can reconstruct the scene of their agony: without difficulty, one calls up the torments and the horror of their last hour, between the land transformed into a lake of hot mud and lava, the air changed into a burning furnace, and the sea lashed into a whirlpool which refused to receive them.

There are seventy of these bodies lying under the massive arcades of the portico, upon the line of the road from Pompeii to Stabia; they are the relics of all classes of unfortunates — men and women, old and young, rich and poor, laborers with calloused hands, and rich epicureans. Some are covered with gold; there is one of them, amongst others, which is distinguished by its rich jewels and amulets, and which must be that of the most important personage, the chief one of the group. Near by his pelvis, which time has deprived of its covering, a girdle was found, and a sword with coquille hilt, which leads one to think that its wearer was a seaman. It remains for the learned amongst us to say whether we are in the presence of the ashes of the edile of some maritime village, of the captain of a galley, or of an admiral. This last hypothesis is that which is preferred by those fertile spirits who rush too speedily to a conclusion, and who have asserted that this is the corpse of Pliny the Elder.

But Pliny, let us repeat, has not lain eighteen centuries under the ruins of Pompeii; when he was found — and this supposition is as easy as it is natural — his relatives and his fellow-citizens, aghast, could not be deprived of the pleasure of erecting to him a mausoleum worthy of his deserts. So, if one must expect everything else from the lavas of Pompeii, so fertile in historic and artistic treasures, one must search elsewhere for the ashes of the grand Roman naturalist.

The wealthy personage whom I have just mentioned, whether edile or admiral, the one whom some suspect to be Pliny, and of whom, perhaps, some day we shall know the real history and the name, does not seem to have belonged to the Pompeian colony. Everything leads to the belief that he was some functionary travelling about his duty or about his pleasure. I need no better proof of this than the composition of the little court which accompanied him and the nature of the baggage which followed him. What likelihood is there that an inhabitant of Pompeii, on the approach of that unheard-of catastrophe, when the flames were darting from Vesuvius like a condemnation for the town built about its feet, would have taken the time to gather together his terror-stricken slaves, and brought together the baggage necessary for a journey? Terror causes one to forget the rules of social life, the little precautions, and effaces all hierarchic differences. This is so simple and true that it seems almost puerile to state it.

Now, here the unknown who interests us met his death surrounded by his court, by his entire *familia*. A few paces from him fell his domestics, at the proper distance required by respect; the death which overwhelmed him laid low at the same time the slave who bore his toilet-service — a precious collection of silverware, finely engraved; the slave physician, near whose skeleton lies his medicine-case, filled with surgical instruments of very careful workmanship, and all the other servants; the one who walked at the head of the procession, lighting the way with his lantern, in the plain obscured by the burning cinders of Vesuvius, a veritable Colossus who measured six feet in height, fell without letting his lantern from his grasp; and farther on were men of herculean proportions, the litter-bearers who must have abandoned their master on his reaching the portico; they have discovered the remains of this litter, without any human relics near it, without an indication which allows one to imagine that its master perished in it; the wood of the vehicle was destroyed, of course, but all the metal ornaments, skilfully wrought, remain intact — amongst others, a fine head of Victory surmounted by an eagle which must have crowned the canopy.

The long portico of the Sarno, supported by robust columns of masonry and brick pilasters, covered with white stucco with red bases, is one of those constructions, so numerous along the course of the old Roman highways, where the voyagers rested during the heat of the day, and where their horses found vast drinking-troughs. Behind the portico rises a mass of structures, a series of sixteen *tabernæ*, or shops, the seventh of which is distinguished by its panels separated by violet-colored pilasters and ornamented with yellow framework around paintings representing bacchic scenes; upon the walls at the back is painted, under the figure of the household god, the goddess of the River Sarno. This shop, then, was a wine-shop; the marble table which is found near the door takes the place of our bar-counter, over which are served drinks. By the door of this wine-shop were found twenty human skeletons, amongst which was one of an infant, and some objects which these fugitives were carrying away: a golden collar, an aureus of Domitian's date, ear-rings, bracelets in the form of a serpent, with eyes of emerald, golden rings, vases, silverware, silver and bronze coins, and so on. In another group were more jewellery and other objects of art: small mounted emeralds, a bracelet finished with a lion's head, a small bust of Silenus, another, in bronze, of Minerva, and a statue of Mercury. It would take too long to enumerate all the little marvels of jewellery which are still being brought up from these excavations on the Sarno. I will content myself with mentioning certain objects, such as a box, divided into several compartments, still containing the remains of color, a pair of scales, more than a hundred fish-hooks and lead sinkers for the fishermen's seines, amphoras of terra-cotta, some of which were painted and enriched with inscriptions, one of them bearing about the neck an inscription which boasts the quality of the wine contained within, the facts concerning its origin, and the name of the vine-grower who produced it on the slopes of Vesuvius and who was sending it to his friends in the city; another amphora still contains the remains of pickled fish, which indicates that the wine-shop was not only used as a drinking-place, but that there were also sold there the coarser foods, at low cost, for the workmen and small tradespeople of the neighborhood.

The money found also has its importance. Although a great many of the pieces have been eaten and deformed by chemical and atmospheric action, and have become in consequence unrecognizable, it has been possible to classify a large number, which fact does not lack a distinct value. In the first place, there are forty-five gold pieces of the times of the following emperors: Augustus, Tiberius, Caligula, Claudius, Nero, Vespasian, Titus and Domitian. Seven hundred and ninety-five are in silver and belong to the times of the Republic and these same emperors, while there are thirteen hundred and twenty-two bronze pieces, all except one dating from imperial times.

From all these indications and from other numberless little details, which would be tedious to enumerate, but especially from the presence in this place of certain articles, — the fish-hooks, for instance, and the instruments used in the making of nets, leaden weights for nets, the anchors and bronze naval ornaments, — it has been inferred that the ruins which are now being brought to light are those of a maritime suburb of Pompeii. Their position gives yet more weight to this hypothesis, for, as we have said, these ruins are at about a thousand metres' distance to the south from Pompeii, and two hundred from the mouth of the Sarno, which formed a little natural harbor. Nothing is more likely than that at this spot on the road from Stabia should have been built the portico in question and the poor habitations of the fishermen and sailors built up against it. So there should have been found here only a few bodies, a few simple amphoras of terra-cotta, a few jewels, if the population of this maritime suburb of Pompeii had alone found their death at this place. But from the city, from the villas of the neighborhood, some fresh from an orgie, with their heads still crowned with roses, others leaving their work or breaking short off in their journey, numberless groups hurried towards this little port in the hope of embarking there and entrusting their lives to the waves; but the absence of boats, and especially the condition of the sea, denied them this last chance of safety, and all found the same frightful death under the arcades of the portico.

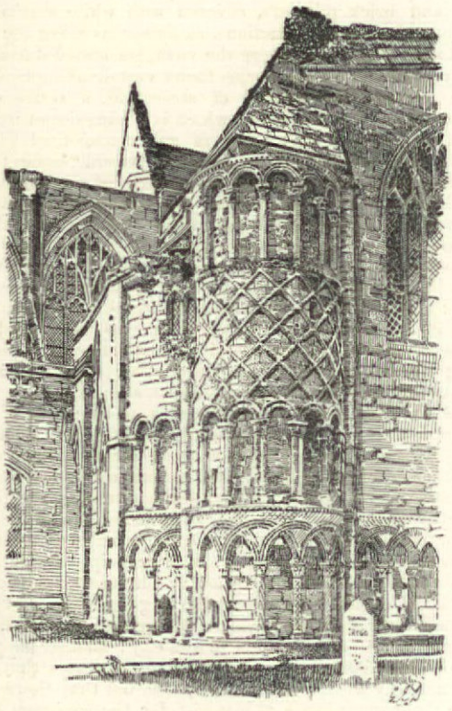
No corpse of Pliny, then, is here, but merely that of some patrician, some dignitary who was passing along the road from Stabia, and had reached the spot where this road crossed this fishing-village, a fact which does not prevent these excavations on the Sarno from being of very great importance, for they will serve to define more closely the physiognomy of the city celebrated for its unique misfortune and clear up certain obscure points in the customs of Pompeian life in the year 79, which we have known only imperfectly up to the present time. So these investigations are being prosecuted with much activity, in spite of the difficulties which are due to the infiltration of water from the Sarno.

H. MEREU.

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES.[1]—IV.

THIRTEENTH CENTURY.

THIS period of architecture is known as the Early English, or "First Pointed," and in English history extends through the reigns of Richard I, John, Henry III and Edward I (1189–1272). These were troublous times in England: the Crusades to the Holy



Christ Church, Hants.

Land under Richard Cœur de Lion; John disputing the authority of the Pope in matters ecclesiastical, ending, however, by his becoming the Pope's vassal and paying tribute; internecine warfare between the King and the Barons, and the wresting by the latter of "Magna Charta," held sacred to this day as the foundation of English liberties.

In Henry's time the first great council of the realm was summoned by Simon de Montfort, an assembly of the "King's tenants," attended also by the Barons and clergy (those, at any rate, who were favorable to the Earl), and this became the first step in the formation of a parliament.

Settlements of students under independent masters not attached to any ecclesiastical foundation were formed at Oxford during the twelfth century, and colleges within the universities were incorporated and endowed, showing the progress in learning during the time under consideration.

These, too, were the times of Robin Hood and Friar Tuck, as told by Sir Walter Scott in "*Ivanhoe*"; of Fair Rosamond and of Thomas à Becket.

The latter part of Edward's reign (1272–1307) is more properly classed with the next, or Edwardian, period.

Towards the close of the twelfth century a remarkable change set in: the arch, that had throughout all past ages and centuries been semicircular, became pointed, an acute junction of two segments of a semicircle; a change so fundamental, so conspicuous, that it entirely diverted the normal method of building and opened up hitherto undreamed of possibilities.

How the pointed arch arose and became an essential element in the architecture of the period is lost in the mists of ages; the interlacing of two circular arches in superficial decorative arcades was not uncommon, as, for instance, Christ Church, Hants, and Castle Acre Priory, which are late Norman; the Crusaders, too, would in all probability have met with the same features in their wanderings in Sicily and France. Flying-buttresses, which spanned the aisles of the Norman churches, were segments of circles butting against the vertical walls of the nave, and demonstrated the stability of one segment.

If we can conceive the necessity arising from hurriedly adapting the centres over which a series of wide semicircular arches had been turned (as in the case of reducing an opening in rebuilding), it is clear that any such reduction would be made by cutting out the centre portion, and bringing together the two segments to fit the opening. We should thus have a pointed arch formed by two similar segments butting at the apex, and, curiously, as lending evidence in support of this contention, we actually find in numerous cases two such segments butted together at the apex, and not built with a key-stone, as before. Pugin, the great apostle of Gothic architecture, was so impressed with this not uncommon construction that he maintained that it was the true Gothic principle: that the Gothic, or pointed, arch was a keyless arch.

When we note that every salient feature was clearly traceable to a defined necessity, and that it was the simplest solution of the case, it is not unreasonable to suppose that the first pointed arch was the outcome of some defined necessity, and that when first seen it was so transparently perfect and beautiful, and opened up such vast possibilities, that it spread abroad, and was adopted by the monastic architects throughout the length and breadth of Southern and Western Europe.

It is possible that among extant examples of the pointed arch the earliest may be found in the Isle-de-France, at Paris, but, with the great intercourse among nations due to the Crusades, each country, no doubt, subscribed its quota of advance. These were progressive times!

The facility of the pointed arch was, however, seized on with avidity; the soundness of its construction, when once seen and appreciated, led the builders of Western Europe to dare to span spaces not before attempted, and to raise their vaults to greater and still greater heights, as we see at Westminster Abbey, 120 feet, and later on, at Beauvais, 147 feet to the underside of the groining. It led up to forms of lofty grandeur soaring skywards, culminating in the spire of Salisbury Cathedral carrying the cross 400 feet above the great plain from which it so grandly rises.

We may broadly note, therefore, that, prior to the last quarter of the twelfth century, all arches without exception were semicircular, and that during the last decade most of the arches were pointed, and that after the commencement of the thirteenth century till near the close of the sixteenth century semicircular arches are never found in work executed during that period.

The juxtaposition and mingling of styles so frequently noticed is due to rebuilding, enlargements, or alterations at subsequent dates which the architecture and detail clearly define. The fundamental principle is that, during any one period, the people, by common consent, spoke, dressed, and built alike. The fashion was all-pervading, and the style in building is the ear-mark of the period. The buildings remaining to us are the history and the romance of by-gone days written in stone, and, when correctly understood, are a study of surpassing interest. They are essentially anecdotal, and remain scattered over the country as feathers dropped from the wings of Time.

The monastic buildings were always in the van of progress, and in them every feature is found more conspicuously developed. We notice, as compared with the work of the twelfth and thirteenth centuries, that the general proportions are more slender and more lofty: the arches are pointed instead of semi-circular, and with a different type of moulding; the chevron decoration has disappeared, and deeply channelled mouldings have taken its place. The piers are composed of clustered shafts as compared with the huge circular shaft of the preceding styles, the external shafts are often detached, and sometimes executed in local marbles, horizontal bands or zones appear on the shafts, the bases have deep hollows between bold, rounded mouldings. The capitals also are totally different, the former cushion type with the square abacus and the angles of the bell rounded off to the circular shaft has been replaced by a well-developed moulded abacus, and the bells of the caps are decorated with freely undercut conventional foliage, springing from the neck and clustering under the abacus, showing a total departure from precedent.

A good deal of rude sculpture is found decorating large doorways, conventional in character, often grotesque, but vigorous, and well adapted to its purpose as decorative enrichment.

The windows are not only pointed, as single lancets, but increase in width and become divided into two or more lights by mullions, which gradually decrease in thickness, the centre light in triplets being the highest. These three lights gradually become enclosed within one external arch, the centre one being the highest, or the head is filled-in with a single stone pierced with foliated openings. This is called "plate tracery," which towards the close of the century gave way to "bar-tracery," which in section is similar to the mullion, but constructed with small stones with joints radiating from the various centres, usually dowelled together, evidencing a great advance in scientific masonry.

The doorways are deeply recessed, enriched in the jambs with slender detached shafts of local marbles and decorated with carving; the arched mouldings are deeply undercut, decorated with the peculiar dog-tooth ornament and the conventional foliage characteristic of the period, entirely replacing the "chevron" and "boutel" ornamentation of the past period.

Surface decoration with the diaper replaces the scale decoration of the Normans.

Pointed vaulting with diagonal ribs replaces the barrel vault of the thirteenth century.

Roofs become high pitched, replacing the flat roofs of the Normans as they cease to be required for defensive warfare.

There is a peculiar cosmopolitanism about the Church of Rome: its official language is Latin; it is a language that is understood and used by all the representatives of the Church, regardless of nationalities, throughout the world; a common or universal language of intercommunication in precisely similar manner as Hebrew is common to Jews throughout all the nationalities of the world. It was this cosmopolitanism, this facility for intercommunication, that spread knowledge, science and the arts simultaneously over the face of Southern and

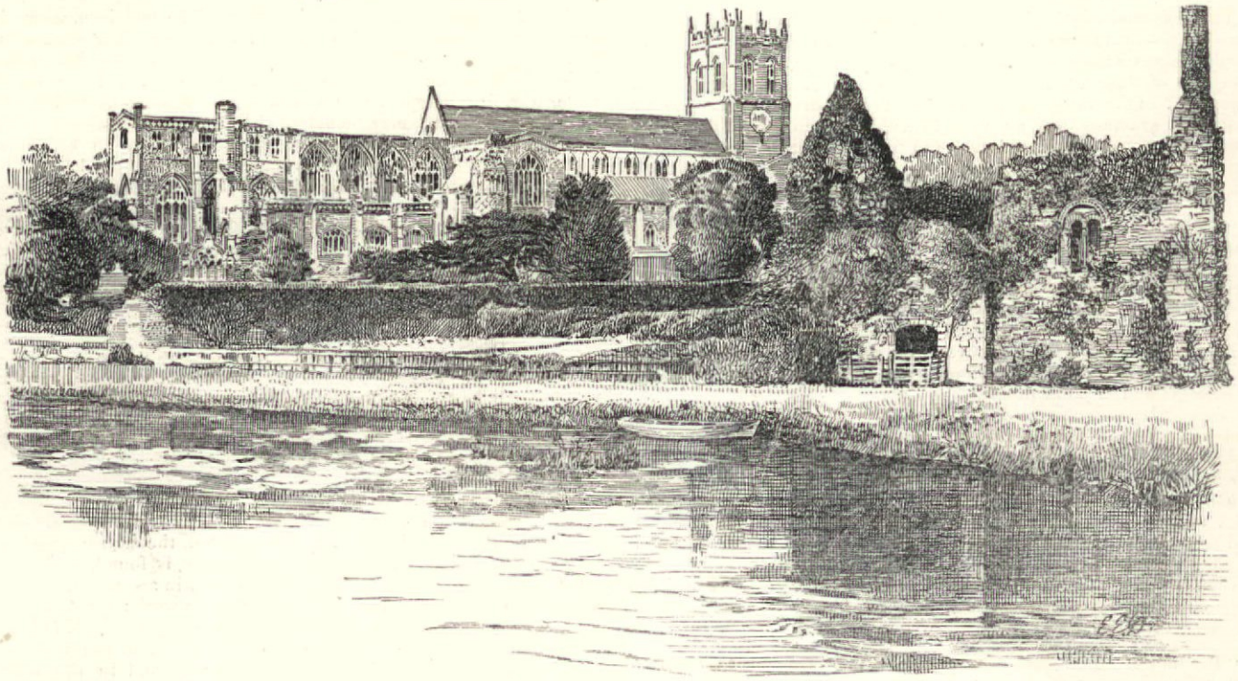
[1] Continued from No. 1328, page 78.

Western Europe; that accounts for the marked uniformity in style of architecture found in all these countries at any one period. As the pronunciation of the Latin tongue varies slightly in different countries, so the architectural expression varies slightly under the influence of climate and the national peculiarities in different countries; but the broad principle is common to all. The advent of the pointed arch marks a contemporaneous epoch throughout Christendom. The Early English is coëval with the "first pointed," or "ogivale primitive," of France.

This period is distinguished not only by the rapid rise of the middle classes, evidenced especially by the assembling of the Commons House of Parliament and the consolidation of public laws, but also by the culmination of the ecclesiastical power in England, which gave so great an impetus to monastic building. This period produced many notable works of ecclesiastic architecture, as for instance, the Abbeys of Dryburg, Netley, Rivaulx, Fountains, Whitby and others, and is also seen in the domestic buildings of the landed proprietors and of those of the mercantile class. The improvements in domestic buildings took place, not so much in the modification of plan or principle as in the general amplification of detail, providing more for the advance in personal and social refinement. All alike proceeded along the path of incessant progress.

privacy; the great log fire was in the midst of the hall, with portable braziers for use in other places; kitchens had the open fire; glass windows were mainly confined to ecclesiastical buildings, framed blinds of cloth or canvas dipped in oil, called fenestrals, being commonly used; furniture was the rough production of the estate carpenter and mostly fixed in its place, and, as Professor Kerr remarks, "spoons and fingers had to serve for forks, and whether between linen sheets in the private chamber of the Baron or under a blanket in the common hall, the sleeper slept without the luxury of a night-dress."

Among the "remains" of this century, Parker gives Temple Farm and Godmersham, Strood, Kent; Aydon Castle, Northumberland; Little Wenham Hall, Suffolk; Charney Basset, and the old Manor-House, Sutton Courtney, Berkshire; Ryball, Rutland; Somerton Castle, Lincolnshire; Stanford and Woodcroft, North Hants; the Prebendal House, Thame; Chipping Norton and Collingsford, Oxfordshire; Gooderich Castle, Herefordshire, etc. The Tower of London was considerably rebuilt by Henry III, and the castles of Manorbere, Kenilworth, Windsor, Raglan, Bodiam and many others were more or less rebuilt, and many scattered manor-houses and granges have portions dating from this century and of clearly marked Early English character.



Christ Church, Hants.

The races had intermarried, and the policy of the Crown was to check the power of the Barons by direct appointment or creation wherever possible, exacting direct personal fealty and homage. During the reign of Henry II the foreign mercenaries were sent away, the reign of the conquering, marauding Norman Baron was drawing to a close, and the Crusades and other foreign wars and travel had enlarged men's minds and improved the manners and customs of the age. The ladies of the period had a certain nobleness of character, the Baroness and her daughters, though not yet very refined and certainly quite unlettered, had begun to consider the great "house-place" of their ancestral "keep" wanting in those conveniences and comforts which developed during the progress of the age. The earlier necessity for security and defence had placed them on the third story in a tower approached by narrow winding stairs. The remoteness of the kitchens and offices impaired their facilities for hospitalities. The growth of these ideas gradually resulted in the abandoning of the keep for family residential purposes and the erection of more suitable apartments and buildings in the court-yard, or inner bailey. We find, therefore, in buildings of the latter part of this century the common hall so situated, to which were attached a "presence" or audience chamber, at one end, and the kitchens and other domestic offices at the other end.

Defensive fortification was still essential; subsidiary towers were built to protect these new buildings, and the old defences of the castle were maintained in efficient fighting condition.

In the new castles built by Edward I in Wales, we find, by comparison, the progress of the times fully illustrated. We find the manor-house with its more spacious chambers, its more expansive accommodation in the family apartments and in the offices, its court-yards surrounded by massive walls and towers as before, and further defended by one or more lines of circumvallation, as may be plainly seen in the works of this period in London and Windsor.

As further evidence of the domestic aspect of the times we may note that ladders and trap-doors were more common than stairs; many of the lofty halls of earlier days became divided by floors into stories; chambers were thoroughfares without much approach to

Portions of the Royal hunting-lodge at Woodstock Chase are of this period, and are inseparably associated with the life and times of Fair Rosamond, her bower being pointed out to this day, though partially destroyed by Cromwell.

THOMAS C. SORBY.

[To be continued.]

PARTIAL USE OF THE DECIMAL SYSTEM THIRTY-FIVE YEARS AFTER LEGALIZATION.[1]

THE process of transition to the use of Federal money, inaugurated by resolutions of the Congress of the Confederation, July 6, 1785, and Aug. 8, 1786, was protracted through the time of our grandfathers, the generation following that which established the money. Kelly's "*Universal Cambist*," whose preface is dated in 1821, thirty-five years after the original legislation, is a standard authority, having had official support. It said of the United States: —

"Accounts are kept here in different ways, but chiefly in Dollars, which are divided into 10 Dimes, 100 Cents, or 1,000 Mills. This is called Federal Money, to distinguish it from the various currencies which were formerly the monies of the United States, and which are still partially retained in domestic traffic. . . ."

The Constitution of Massachusetts said then, and says now, in Chapter VI: —

"III. In all cases where sums of money are mentioned in this constitution, the value thereof shall be computed in silver at six shillings and eight pence per ounce. . . ."

The United States Mint, though it began to coin money in 1793, did not strike many coins except cents, half-cents and half-dollars down to 1820; and coins of the several nations of Western Europe continued in circulation. The Spanish original of our dollar was well known as the "piece of eight," meaning eight "bits" in the

[1] A paper published in *School Science* for December, 1901.

vernacular tongue of the United States, where the Spanish name is less familiar; one bit thus becomes 12½ cents obviously to us, but our grandfathers knew it as of the value expressed according to their long established custom in their different monetary reckonings. John Quincy Adams, Secretary of State, in his celebrated report on weights and measures, also dated in 1821, wrote as follows: —

". . . now, when the recent coinage of dimes is alluded to in our public journals, if their name is mentioned, it is always with an explanatory definition to inform the reader that they are ten-cent pieces; and some of them which have found their way over the mountains, by the generous hospitality of the country, have been received for more than they were worth, and have passed for an eighth, instead of a tenth, part of a dollar. Even now, at the end of thirty years, ask a tradesman or shopkeeper in any of our cities what is a dime or a mille, and the chances are four in five that he will not understand your question. But go to New York and offer in payment the Spanish coin, the unit of the Spanish piece of eight, and the shop or marketman will take it for a shilling. Carry it to Boston or Richmond, and you shall be told it is not a shilling but nine pence. Bring it to Philadelphia, Baltimore, or the City of Washington, and you shall find it recognized for an eleven-penny bit; and if you ask how that can be, you shall learn that, the dollar being of ninety pence, the eighth part of it is nearer to eleven than to any number. . . ."

This was characterized by Mr. Adams as absurd, and justly. Oh, yes — but — by the way, what is it that we are doing, A. D. 1901, thirty-five years after the inauguration by our fathers by the Act of Congress of July 28, 1866, of the change to metric weights and measures? Our rates of postage on foreign-mail matter are by weights in grammes, and we try to look them up in pocket diaries or other common places of reference and find them inaccurately stated by weights in ounces. We turn to the Revised Statutes of the United States, Section 3515, referring to our minor coins, and read:

"The weight of the piece of five cents shall be seventy-seven and sixteen-hundredths grains troy: —"

a circumlocution for five grammes. We have had profile-paper printed with metric subdivisions for its whole length and have measured it off in portions for sale by the yard. Imported paper in rolls of ten metres we have advertised as eleven-yard rolls. These few examples suffice out of many instances of misapplication of units of quantity in business and in publications.

We see the unreasonableness both of the Massachusetts Constitution and of the adherence by our grandfathers, so long after they had established decimal reckoning, to their antiquated book-keeping, which occasioned great inconvenience from the incongruity of the two methods in use at the same time. When our grandchildren look back to 1901, what will they say of our now hanging on to weights and measures that are out of date by consequence of the substitution of the metric units legalized thirty-five years ago?

Consider electricity, whose standards of measurements are fixed upon a metric basis by the law of July 12, 1894. The following is an extract from it: —

"The unit of power shall be the watt, which is equal to ten million units of power of the centimetre-gramme-second system, and which is practically equivalent to the work done at the rate of one joule per second."

Several of the electrical units have become familiar to us through the enormously rapid development of the applications of electricity. This is the case especially with the kilowatt, a commercial unit which we meet with in almost every technical publication we take up; but it has not yet entirely displaced that anomalous old unit, the horse-power (as to which reference may be made to *Engineering*, vol. 63, pp. 245 and 325, for Feb. 19 and March 5, 1897).

Consider the matter of assaying and coinage, in which the metric system is established. It has been used in the Mint for years, and is used in published tables or schedules of coins. The United States subsidiary silver money weighs one gramme per four cents, and thus metric weight is in everybody's pocket. The troy pound has dropped out of practical use. Nevertheless, the troy ounce, incongruous as it is with other weights and measures, still comes in our way sometimes (in other places besides the Massachusetts Constitution).

Consider pharmacy and some other matters connected with chemistry. The "*United States Pharmacopœia*," the reference manual of the apothecary, is exclusively metric. The "*Dispensatory*," the corresponding manual of the physician, has metric values throughout. The use of the metric system was introduced in the United States Marine-Hospital Service about a quarter of a century ago quite thoroughly, and in the army and navy more recently. In practice in civil life prescriptions are to a large and increasing extent written in metric terms; but the mysterious old "apothecaries'" weights and measures (which for sales of candy and popular wares are not used by apothecaries) continue to be used in the prescriptions of some of the older physicians, who in the natural course of events are gradually passing off the stage. Meanwhile, pharmacists have double sets of weights and measures, and employ clerks who understand both, with extra trouble, cost and risk of mistake. In the sale of high-grade chemicals the metric system has been introduced. E. R. Squibb & Sons, of Brooklyn, have used it exclusively for nine years, and the Bausch & Lomb Optical Co., of Rochester, issues a sixty-page priced catalogue "G" of "Chemicals and Reagents" in metric terms, with a conspicuous notice at the top of each page, "Prices of Chemicals are by Metric, *not* Avoirdupois Weight." Much glassware and rubber stoppers are made to metric scale. As to chemical manufacturing, all the tanks in a factory built by the Merrimac Chemical Company, of Massachusetts, for their extensive sulphuric-acid works, were made on metric dimensions, and the Pennsylvania Salt Manufacturing Company have built a large plant entirely upon metric dimensions. The great Solvay Process Company, of Syracuse, makes use of the metric system in every way possible in its works. Drawings to go outside of the works for construction, etc., are not made in the metric system. The Company says it finds no disadvantages, and would be very glad if its entire work could be upon the metric system. That means that as long as people outside cling to ancient weights and measures, so that conformity with them is required of the Solvay Process Company, the Company gets only part of the advantages naturally belonging to its system. Chemical analyses are expressed in parts per million, per hundred thousand or per thousand, corresponding to grammes per cubic metre, per hektolitre or per litre. Grains per gallon are out of date. Nevertheless, in dealing with quantities and consumption of water, there still lingers some use of the United States liquid gallon, a unit long ago abandoned in Great Britain and Canada, distinguished for its lack of connection with other measures or weights, and not ordinarily used in the reading of water-meters.

Consider geodesy and precise levelling. The metric measure has been very extensively used in precise levelling or other work of the United States Coast and Geodetic Survey, the United States Geological Survey, the United States Lake Survey, and the surveys under the Mississippi River Commission. Among other literature from which evidence may be obtained about this, and about working in old measures incongruous with metric, there is an article and discussion on "Precise Spirit Levelling," occupying pp. 1-206 of vol. 45 of the *Transactions* of the American Society of Civil Engineers, June, 1901.

Bulletin No. 26 of the United States Coast and Geodetic Survey, dated April 5, 1893, contained an announcement signed by T. C. Mendenhall, Superintendent of Standard Weights and Measures, and approved by John G. Carlisle, Secretary of the Treasury, from which the following is an extract: —

". . . the Office of Weights and Measures, with the approval of the Secretary of the Treasury, will in the future regard the international prototype metre and kilogramme as fundamental standards, and the customary units, the yard and the pound, will be derived therefrom in accordance with the Act of July 28, 1866. Indeed, this course has been practically forced upon this Office for several years. . . ."

The Treasury Department is the department to which are attached the Mint, the Marine-Hospital Service and the Coast and Geodetic Survey, in all three of which, as above stated, the metric system has been in practical use for years. Incongruity is found, however, in the fact that the Treasury Department continues the use of old weights and measures in other branches of its work; for example, in its Bureau of Statistics, largely occupied with foreign trade (whereas metric units have been introduced to some extent in the Bureau of Foreign Commerce of the State Department and in the section of Foreign Markets of the Agricultural Department); and for another example, in the Customs Service, where there will be special gain in the substitution of the international system, and where its substitution has been repeatedly urged, officially and unofficially.

Consider manufactures. The April, 1900, report of the American Railway Association's Committee on the Metric System enumerated among manufactures in which the metric system has been introduced watches, injectors, refrigerating-apparatus, screw-cutting lathes, scales, drills, gauges, astronomical and physical instruments, measuring implements and draughtsman's supplies. A very large number of manufacturers have had some call for the application of metric measurement for goods for export, if only on a small order; and goods of widely diverse character are among the metric manufactures. We have exported to metric countries a great deal of ordnance and machinery for manufacturing ordnance, and rapid-firing guns have been designated by their calibre in millimetres. The Baldwin Locomotive Works' illustrated catalogue of narrow-gauge locomotives has printed on its title-page, "Adapted Especially to Gauges of 3 Feet 6 Inches, or One Metre," and on each of the sixteen pages (108–38), on which are tabulated various types of locomotives, has printed conspicuously, "Gauge, 3 Feet 6 Inches, or One Metre." The Library Bureau, of Boston, has cards and cases made of exact metric dimensions. In the *Electrical Review* (New York) for June 22, 1901, Geo. H. Draper says: —

"There is no first-class shop in America that will not undertake to build machinery according to metric measurements, and many of them are at the present time compelled to build stock forms of machinery in measurements of this system in order to be able to compete for trade in foreign countries where the specifications are given in round metric terms."

The following sentences are quoted from the *American Manufacturer*: —

"The metric system is making some headway among American manufacturers engaged in the export trade. This is especially true of machinery builders. It will continue to make headway according to the increase of our exports. . . .

"There are firms that have adopted the metric system for their export business. They do not seem to be suffering from the effects of having two sizes of templates and dies for their plants. They are filling orders for export and are teaching their workmen the use of the metric system in so doing."

The incongruity of having two sizes, whether there seems to be suffering from the effects or not, continues until the superseding in domestic trade also of old weights and measures by metric. A similar remark may be made in regard to United States importations of bottled goods, textiles and other manufactures from foreign countries where the metric system is in use.

Consider bodily measurements, etc. The stature and strength of athletic young men in the colleges in different parts of the country are recorded in metric units and are published; but sometimes the newspapers, instead of recognizing the kilos, call them "points." Dimensions of statuary, etc., have been given metrically in the reports of the Boston Museum of Fine Arts regularly for many years. There is great convenience in measuring the clothes, as well as the body, in centimetres, not requiring fractions; and among men's furnishing goods some suspenders may be found with the length marked upon them in centimetres; but there remains in principal use for the measurements of tailors and dressmakers, and for sizes of such things as gloves and hats, the old unit with the ubiquitous fraction.

Consider applications of science. The metric system has been thoroughly adopted for scientific research upon all subjects and for the diffusion of scientific knowledge by publications and educational institutions. The extent of its use for instruction, laboratory supplies, apparatus, etc., is enormous; yet when scientific knowledge is utilized in technical work or for commercial purposes it often happens that old units of measurement are employed; so we have the incongruity of preaching one thing and practising another, of producing certain effects with one measure in investigation and with another measure in business. Such complications are now a characteristic feature in our literature, the discussions of our professional organizations, reports of committees of research, periodical publications, or books of the day. Similar complications are common in shops, offices and practical work, a fact so familiar as to require little illustration. Fineness of sand is expressed by the millimetre, and fineness of the sieves and screens for it by the number of meshes per inch. It is by the cubic centimetre of water that the number of bacteria are reckoned in biological examinations, but, rather than say so, men otherwise intelligent have sometimes disguised it for the popular mind as "thimbleful." Opticians have adopted metric measure, and, besides whatever else they have done in regard to their apparatus and accessories for microscopy, etc, they have a metric basis for expressing the power of lenses of spectacles. Their "dioptrics," depending on the focal length in metres, are found in the optician's price-list; yet it is not uncommon to express the diameters of lenses in old measure, which may be found even in the same catalogues that give generally the metric system.

It is needless to marshal further evidence. The cutting off of the dog's tail is by centimetres, so that the tail may continue in some measure to wag the dog as long as he likes to have the operation protracted.

BOOKS AND PAPERS

FEW people realize the advance which has been made within the last twenty years in the matter of public water-supply, and sanitarians and engineers, to whom the improvement is almost wholly due, would deserve the gratitude of mankind for this work, if they had never done anything else. On the other side of the ocean, much greater progress has been made than here. Twenty or twenty-five years ago, it was not only disagreeable, but often dangerous, for an unacclimated tourist to drink the water supplied to the cities of Paris, Liverpool, Venice and Naples, to say nothing of smaller towns. Now each of these cities is abundantly supplied with water of a purity which would make almost any American city envious. Paris has its special supply of spring-water; Liverpool has brought water from the mountains of Wales by a submarine tunnel; Venice has replaced its cistern-water by an ample supply from the mountains of the mainland, and Naples has just finished an aqueduct, some twenty miles long, which brings the clearest water in profusion from springs in the mountains. To those elderly tourists who remember the pangs which, not very many years ago, followed indulgence in the drinking-water then supplied to these places, the change is very striking; and more than one such person, probably, has wished that similar regeneration might come upon Philadelphia, Boston, and other towns of our own. In this compact and convenient book [1], the third edition of a work which first appeared only five years ago, Mr. Thresh gives an immense amount of valuable, and thoroughly modern, information in regard to what might almost be called the new science of gathering, purifying, preserving and distributing both public and private water-supplies. As readers of technical books know, English works of the kind often contain an inordinate amount of padding, in the shape of accounts of the engineering practice of the ancient Romans, and long descriptions of constructions of the period of George the Fourth; and it may relieve the minds of such persons to know that Mr. Thresh has found enough matter of interest and importance to fill his work completely, without any archæological or historical digressions.

Beginning with the necessary observations on the sources and properties of water, the book continues with an examination of public water-supplies as they actually exist, including the sources of contamination to which they are exposed; and here we find a concise, but most instructive, review of the cases of contamination by microscopic animals and plants, so many of which have been recently reported, and of the measures, unsuccessful and otherwise, which have been taken to remedy the trouble. Next to this we find a chapter of great importance, on the "self-purification of rivers," in which the results of modern investigation are well summed up by the author, who says, "The question in which we are interested, therefore, is, not whether a fouled river-water may regain its pristine appearance of purity, but whether it can ever again become absolutely safe for drinking purposes. Ordinary observation enables us to answer the first question in the affirmative; all the researches of chemists and bacteriologists, since the days when the Rivers Pollution Commissioners first experimentally studied this subject, have failed to answer the second." On the whole, Mr. Thresh thinks that the preponderance of evidence is "decidedly on the side of those who uphold the theory of self-purification"; and the most important opinion on the other side seems to be that of the Massachusetts State Board of Health, which says that "no river is long enough to purify itself." In the approaching struggle between the cities of St. Louis and Chicago, in regard to the pollution of the Mississippi River by the Chicago Drainage-canal, this matter will, presumably, be thoroughly discussed to the advantage of mankind.

After this, we find discussions of the sources of public and private water-supply, and of the modern modes of storage, which, as all architects and engineers know, have been greatly modified within the past few years; and these, with some observations on distribution, complete an extremely useful little book.

[1] "*Water and Water-supplies.*" By John C. Thresh. Third Edition, Revised and Enlarged. Philadelphia: P. Blakiston's Son & Co. 1901. Price, $2.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ENTRANCE TO THE EQUITABLE LIFE ASSURANCE BUILDING, BROADWAY, NEW YORK, N. Y. MR. GEORGE B. POST, ARCHITECT, NEW YORK, N. Y.

HOUSE OF JOHN CALDWELL, ESQ., STOCKBRIDGE, MASS. MESSRS. G. E. AND G. FOUNTAIN, ARCHITECTS.

RIVAULX ABBEY, ENGLAND; — ITHAM MOAT, ENGLAND.

FOR reference to these and the following subjects see article elsewhere on the "Domestic Architecture in England during the Middle Ages."

CASTLE ACRE PRIORY, NORFOLK, ENGLAND.

[The following named illustration may be found by reference to our advertising pages.]

"TIGBOURNE COURT," WITLEY, ENG. MR. E. L. LUTYENS, ARCHITECT.

THIS plate is copied from the *British Architect.*

[Additional illustrations in the International Edition.]

BANKING-HOUSE OF EDWARD C. JONES, PHILADELPHIA, PA. MR. GUY KING, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF MOORFIELD STOREY, ESQ., 24 FENWAY, BOSTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

TERRACE GARDENS, FOOTS GRAY PLACE, SIDCUP, ENG. MESSRS. T. H. MAWSON AND D. GIBSON, ARCHITECTS.

THIS plate is copied from *Building News.*

PINE-TREE FORMS AS FRIEZE DECORATIONS.

THIS plate is copied from *Art et Decoration.*

TERRACE AND SUMMER-HOUSES, DAZHAM HALL, SUFFOLK, ENG. MESSRS. T. H. MAWSON, C. E. MALLOWS & GROCOCK, ARCHITECTS.

THIS plate is copied from *Building News.*

NOTES & CLIPPINGS

FORGED PICTURES. — The statement by Mr. Sidney Cooper, R. A., that of 287 pictures purporting to be by him no fewer than 255 had proved on examination to be frauds and the signatures forgeries has naturally aroused widespread interest. Unfortunately for the artist, the imitation of his signature on a painting is not forgery in the eyes of the law. To constitute forgery the thing imitated or falsified must be connected with a document or a writing. Consequently it is a common thing for pictures to be copied and the signature of the original painter boldly inserted. Sir Lawrence Alma-Tadema said recently: "I have been chairman for three or four years of a committee which has been striving to amend the laws of artistic copyright. We got as far as introducing a bill, but the House of Lords cut out the most important points as affecting artists. They knew nothing of the subject, and Lord Thring went so far as to make the strange statement that an artist's signature on a painting was not a signature but a part of the painting itself. It is a scandalous state of things that a painter is not protected in his copyright. The purchaser is protected, but not the painter." Mr. S. J. Solomon, R. A., had much the same story to tell — he is also a member of the Artistic Copyright Committee — and drew attention to the enormous number of piracies and forgeries on the Continent. "There are literally thousands of Corots," he said, "which have never been within a mile of Corot's studio." The chief art-dealers of London are on the side of the artists in this matter. At Messrs. Agnew's, in Bond Street, a hearty agreement with Sir L. Alma-Tadema was expressed, and it was stated that it was also as much in the interest of the purchaser as that of the artist that the copyright law should be amended. At Messrs. Graves's galleries in Pall-Mall it was stated that copies and imitations were regularly manufactured in this country as well as in France and elsewhere. — *London Daily Mail.*

TWO THEORIES OF WHITE LIGHT. — In an article in *Comptes Rendus*, by O. M. Corbino, two opposite views of the constitution of white light are stated, and a theoretical decision between them, based on known experimental results, is arrived at. Gouy maintains that the constituents of the spectrum of white light are the sinusoidal components of a single complex vibration, and are capable of mutual interference; while Carvallo regards the separate radiations as completely independent, and therefore incapable of interference with one another. The latter view is supported by the spectroscopic observation of beats produced by two pencils of white light, one of which is slightly altered in period by means described elsewhere by the author and by Righi. In the case of monochromatic light, alternations of light and darkness are observed; in the case of white light, movable fringes are seen. In the latter case the fringe system should exhibit no alteration when the change of period is effected, if the hypothesis of Gouy is true. The fringes are, however, seen to move, and hence it follows that interference takes place only between radiations which had the same period in the source before the alteration of period, and not between those which, originally different, have been brought into coincidence of period. Hence, the second hypothesis is accepted. — *N. Y. Evening Post.*

A REPENTANT VANDAL. — At Mount Vernon there is the largest army of "spotters" on the lookout for vandals; and it is more necessary there than anywhere else, for Washington's home would be easily despoiled. The visitor pays a quarter admission, and the money goes to pay his watchers. There is one thing in the house that strikes the notice by its contrast with the prevailing simplicity. It is the carved mantelpiece of Carrara marble in the dining-room. One who is not a vandal cannot gaze upon it without anathematizing the whole race of relic-seekers. Even with watchers in every room some individual managed to "get in his work" and get off the head of a galloping deer in the centre of the group. The animal remained headless for months. Then one day the head came back in a little box. It was post-marked Paris. An accompanying note stated: "It did not occur to me, in my own country, where everything is so well cared for and preserved, the outrage that it is to mutilate historic places for relics. Here in Europe nothing is preserved; everything is marred and chipped and broken by travellers like myself. I return herewith," etc. The letter was anonymous. When the head was put back the glue stained the marble, and the milkwhite deer has a yellow streak around his neck. — *N. Y. Tribune.*

FINE FOR COUNTERFEITING OLD TAPESTRIES. — The Paris Court of Appeals has given its decision in the case of tapestry-dealers who had falsified their wares so as to resemble antiques. Charlaunes, of Paris, and Sauvageot, of Troyes, had sold these "doctored" aubussons to Mme. Lemaitre, of Epernay, and for this offence the Seine tribunal condemned them some days ago to six months' imprisonment, $200 fine and $1,400 damages. On appeal, the sentence has been confirmed, and the damages increased to $2,600. — *Exchange.*

DAMAGE DONE BY LOCOMOTIVE SPARKS. — Damage to property through the ejection of sparks by locomotives is an old grievance of those holding property adjacent to railways. The question has, however, been brought rather prominently forward of late by one or two serious fires and by correspondence in the *Times* and in the columns of the *Engineering Press.* Under the present state of the law, railway-companies are not responsible for fires caused by their locomotives, so long as the best known appliances are fitted for preventing, as far as possible, the escape of sparks from the chimney. A bill was recently introduced into Parliament to alter these conditions, but failed to pass. It will, however, probably be brought forward again next session. The case of Hipkins *vs.* the London and Southwestern Railway Company, recently tried and settled in favor of the defendants, produced a good deal of interesting evidence on the part of railway-engineers, both English and American. For the plaintiff, whose field of corn was burned, it was held that if the engine had had a netting or grid below the base of the funnel dangerous sparks could not have been emitted. The arrangement is common in America, but it has its drawbacks, inasmuch as it checks the draught and thus reduces the efficiency of the engine. Partly to get over this the American engineers prolong the smoke-box in front of the boiler so as to get in a bigger netting and thus give a larger area for draught. The somewhat unsightly extension of the boiler structure beyond the chimney, which adds so much to the grotesque appearance of American locomotives, is accounted for in this way. — *London Times.*

CONTROLLING THE SHIFTING SANDBANKS ON CAPE COD. — The Harbor and Land Commission of Massachusetts is trying an experiment, which, if successful, will attract attention outside of the Commonwealth and will be adopted by other States along the coast which are similarly afflicted. This affliction is the shifting of the sand by the wind on Cape Cod and is a constant annoyance to those who live or spend the summer on "The Right Arm of Massachusetts." Provincetown, situated on the extreme end of the Cape, has been the greatest sufferer, and a fine pine-grove, the pride of the town, which was set out a few years ago, is threatened with swift destruction by the blowing sand. The remedy which is under trial is simple, and consists of planting beach grass along the ocean side of the Cape. A few months ago a large amount was transplanted from another part of the State, where it was not needed. It is hoped that the grass will spread, and it is said that the roots will hold the sand better than anything else that is known. The sand-dunes of Cape Cod grow at the rate of about two feet a year, and the force of the sand driven by the wind is so great that the glass in the lanterns of some of the lighthouses becomes completely ground in a short time and frequently has to be renewed. — *N. Y. Tribune.*

SOUTHERN PINE OUTPUT. — Secretary George K. Smith of the Southern Lumber Manufacturers' Association, in his annual report before that body, gave out statistical information which will be of interest to manufacturers of lumber throughout the United States. An average of 160 mills for the twelve months of the year, embracing 1,759 firms, cut 1,992,602,851 feet, while shipments for the same time were 2,090,120,270 feet. This is an increase of 200,000,000 feet in the output as compared with the previous year, or 11 per cent, while shipments were in excess of those of 1900 by 344,000,000 feet, or 20 per cent, thus reducing stocks held 100,000,000 feet, or about 10 per cent. These figures apply to the yellow-pine lumber situation. With regard to white-pine, there was a reduction, through excess of shipments over cut, of 200,000,000 feet, or 13 per cent, in the visible supply up to Dec. 1, and an increase in output of 119,000,000 feet, or 5 per cent. — *Exchange.*

TROLLEY-OPERATED FIRE-ENGINES. — The Chief of the Fire-department at Rouen proposes to make use of the electric trolley-wires which extend to so many parts of the city, and in which power is or can be always ready for use as a source of power for driving the pumps of fire-engines where the fire occurs in the neighborhood of electric tramlines. The fire-engines will be fitted with electric-motors instead of steam-engines, and connection will be made to the trolley-wire or to the trolley-feeder in the immediate neighborhood of the burning building. The arrangement should save valuable time, especially during that important first fifteen minutes, since there will be not even the necessity of getting steam up from banked fires. If also the connection to the electric tramway service is made at one of the feeder-pillars, as can easily be done, the tramway service should not be interfered with. — *London Trade Journals' Review.*

TRANSPLANTING TREES FOR THE ST. LOUIS FAIR. — Probably the largest contract ever let in this country for the transplantation of big trees is that just entered into for the World's Fair in St. Louis. The site of the World's Fair is Forest Park, in which there are many large trees. Actuated by a desire to preserve as many as possible of the trees and to have their shade in the broad avenues of the Exposition, the Director of Works will have 700 trees, each 12 to 18 inches in diameter, lifted and replanted where they will remain permanently. Special machines will be used and the transplanting will be done while the trees are dormant and the ground is deeply frozen, so as to carry as much earth with the roots as possible. Very great care is required for a successful operation, and the trees will be given the best care and attention, in order to assure their thrifty growth. The trees are principally maples and elms. — *Boston Transcript.*

CARPEAUX'S MODELS. — The Paris *Chronique des Arts* announces the gift to the city of Paris by the widow of the sculptor Carpeaux of a large number of important studies found in the master's atelier after his death. Especially interesting are the monumental group erected to the memory of Maréchal Moncey, and the studies for the famous figures of dancing nymphs in white marble on either side of the main entrance of the Opera-House. These figures were criticised thirty years ago as too bold, criticism taking the shape one night of a shower of ink, an act which aroused a stormy controversy that lasted for months, Napoleon III was, however, a firm friend of Carpeaux, and the statues remained. Carpeaux's study for a monument to Moncey was not intended for execution, as he was a member of the jury that awarded the prize, but simply as an expression of his own ideas upon the subject.

THE SPEED OF SOUND. — The last determination of the speed of sound has been made by Mr. A. Leduc, who finds that the rapidity of propagation of sound-waves through dry air at 0° C. (= 22° F.) is 1,088.58 feet per second. — *Comptes Rendus*, December 26, 1898.

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, FEBRUARY 1, 1902 No. 1362

CONTENTS

SUMMARY: —
Suggestions of the Commission on the Improvement of Washington. — The Succession to the Office of Architect of the U. S. Capitol. — The Master Builders' Code of Ethics. — Death of J. Appleton Brown, Painter. — The New York Board of Building Examiners. — Projected Completion of the old Hudson River Tunnel. — The French Minister of Fine-Arts disposed to enlarge the Opportunities of Women in the Schools. — Fall of Buildings in Detroit. 33
LETTER FROM WASHINGTON. 35
BOOKS AND PAPERS. 36
THE HERMES RECOVERED NEAR ANTICYTHERA. 38
SOCIETIES 39
ILLUSTRATIONS: —
"Ventfort Hall," Lenox, Mass. — "Shoreby," the Summer Home of Samuel Mather, Esq., Shore of Lake Erie. — A Competitive Design for the Roswell P. Flower Memorial Library. — Public Library, Thompson, Conn.
The Hungerford Memorial Bede Houses and Free School, Corsham, Wilts, Eng.
Additional: The Main Front: "Ventfort Hall," Lenox, Mass. — The Garden Front: "Ventfort Hall." — House of J. W. McClymonds, Esq., Massillon, O. — Competitive Designs for the Façade of San Lorenzo, Florence, Italy. 40
NOTES AND CLIPPINGS. 40

THE new Commission for the improvement of the city of Washington has placed on view, as promised, its preliminary plans and models for the scheme which it proposes. They are, certainly, sufficiently radical to suit the most ardent lover of reform, but it can hardly be said that they are too much so, in view of the end which it is desired to accomplish, and which can be accomplished more easily and cheaply now than in the future. Practically, the plan contemplates condemning the whole territory between Pennsylvania Avenue and the river, for a distance of a mile or more, removing the present buildings, and remodelling the streets. From the Capitol is to extend westward to the river a "boulevard," bordered by parks, something after the fashion of the Champs-Elysées, in Paris. These parks are to form the site of public buildings, which will stand isolated in them, as the palace of the President of France stands in its own garden adjoining the Champs-Elysées. The western end of the "boulevard" is to be continued by a monumental bridge across the river in a straight line toward Arlington. It is quite possible for such an avenue to have a wearisome straightness, and the Commissioners, although they did not think it advisable to curve it in plan, have, with true artistic feeling, provided variations of level in it, which, without interrupting the beautiful vista toward the Capitol at one end, and the heights of Arlington at the other, will greatly relieve its monotony. Between the White House and the Monument the present uninteresting open space, containing some irregular ponds, is to be transformed into an elaborate garden, or small park, adorned with bridges and terraces, and surrounded by public buildings. Beyond this, a wide driveway is to extend along the river-front, from the Arsenal grounds to Rock Creek, then turning, and following the valley of Rock Creek to the Zoölogical Park and the Soldiers' Home. As a portion of the river-front is occupied by warehouses and steamboat-landings, it is proposed to carry the new driveway over this portion by a viaduct, so that the traffic between the landings and the main part of the city can be carried on without interfering with pleasure driving. Although the execution of the plan will be costly, it need not be extravagantly so. The Government already owns a considerable portion of the land included in the scheme, while, of the rest, much is at present of little value. It can hardly be questioned that the southwestern part of the city, sloping from Pennsylvania Avenue to the river, is susceptible of far more artistic treatment than any other portion, and it is none too soon to take it in hand, and begin its transformation into what would be a piece of municipal landscape architecture of unexampled magnificence.

MUCH interest has been excited by the question of the appointment of the successor to the late Edward Clark, Architect of the Capitol at Washington. The laws of the United States provide that this official shall be "a professional architect," which is certainly a reasonable requirement, but it seems that the principal clerk in the office of the late Mr. Clark, who, as we understand, does not claim to have had a professional training, but who has shown great efficiency in the prosecution of work directed by his chief, and ingenuity in devising ways of accomplishing results, is likely to receive the appointment. Mr. Woods is popular in Washington, where personal popularity counts for a great deal, and is, undoubtedly, on excellent terms with the architects who frequent Washington society, as well as with their friends; so that they deserve to be honored by the profession and the public for having, in most cases over their own signature, and at the risk of offending their personal acquaintances, called attention to the requirements of the law, and to their obvious inapplicability to Mr. Woods. For the moment, there seems to be a feeling in Congress that the general professional protest against the appointment has something exclusive and unfair in it, and it has been proposed to change the law, which Congress and the President can, of course, do, so as to permit the appointment of a layman as Architect of the Capitol, joining to him, on occasion, a consulting architect of recognized professional standing; the idea being, of course, to open the way for the appointment of Mr. Woods.

WE need hardly say that this would be a most deplorable proceeding, and it is to be hoped that the public will support the profession in earnest deprecation of any legislation of the sort proposed. We have a high opinion of Mr. Woods, personally, and the best wishes for his advancement, but this cannot blind our eyes to the fact that the Architect of the Capitol is entrusted with the artistic as well as the scientific care of what we feel to be one of the most beautiful buildings in the world, and the highest professional accomplishment that the country can produce is not too high to be devoted to its service. It is true that Congress proposes to appoint a "consulting architect," to advise, whenever he happens to be called upon, in regard to artistic matters concerning the Capitol; but the profession is very familiar with consulting architects, and with the real influence which they exert on the building-work with which they are supposed to be concerned; and we venture to say that every member of it who has acted as consulting architect, or has been associated with one, will agree with us that such an official would be powerless to prevent the destructive tinkering with the Capitol which seems to form the mania of so many people, in and out of office, in Washington. It is not many months, for example, since the newspapers informed us that huge "pylons" were to be set up somewhere about the entrance to the Capitol; and not a year passes without the promulgation of some monstrous scheme, often with very powerful backing, for making our beautiful building ridiculous. Even if a "consulting architect" were "consulted" about these precious schemes, which he rarely would be until their originators had made their success secure, his authority, as a mere adviser, would be insufficient to prevent their execution, and the division of responsibility would do more than anything else to destroy the possibility of the resolute and intelligent control which alone can save the Capitol from disfigurement.

THE local Associations of Master Builders are quite generally adopting a code of ethics, by which the unwritten law, requiring general contractors who ask for or receive sub-bids to employ the lowest sub-bidder in case the contract is awarded to them, is made into a written law, with a penalty attached to its violation. As the rule is obviously founded on courtesy and justice, no one will regret to see it enforced by a measure which should do much to prevent the disappointments and recriminations that so often follow the award of important contracts; but architects have also an important interest in the award of sub-contracts, and they should be more careful than ever not to let the control of the selection of sub-contractors slip from their hands. It is common in building-contracts to stipulate that neither the whole nor any portion of the contract shall be sublet without the written consent of the architect; and every architect knows that this restriction is absolutely essential to the proper execution of the agreement. No matter how honest or popular a mechanic may be, he cannot carry out satisfactorily work in which he is inexperienced;

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

and architects continually have sub-contractors proposed to them who are not only inexperienced, but, in many cases, of very doubtful honesty. The new code of builders' ethics provides that a principal contractor who receives and opens a bid, no matter who it may be from, is bound to give the same consideration to it, and to the party submitting it, as to those submitted by his special request, and it is evident that a busy or good-natured contractor is likely, under such conditions, to find himself bound to sub-contractors whom he does not wholly approve. It has been the rule in these cases for the general contractor to shelter himself behind the architect, and to get rid of the questionable sub bidder by telling him that the architect would not accept him; but, under the new code, this will not be so easy, as, although a clause in the contract requiring the architect's approval of all sub-contractors is, of course, paramount to any regulations which the builders may adopt among themselves, an aggrieved sub-bidder, by appealing to the authorities, and demanding damages, may give a great deal of trouble to all parties concerned. The simplest method of meeting the difficulty is one which has already been adopted by the most experienced architects, consisting simply in a demand that each principal contractor shall submit to the architect a list of the persons whom he intends to invite to make sub-bids, to be revised and approved by him before the invitations are issued. In this way the principal contractor escapes the necessity of offending his acquaintances, by casting the blame for their exclusion on the architect; and, as the latter exercises his right of approval before the invitations are sent out, there is no chance of trouble from a sub-bidder whom he has been obliged to reject after the sub-bids were in. The better class of general contractors accede readily to this arrangement, which protects them against misunderstandings with their sub-bidders, besides doing much to save them from being saddled with the responsibility for incapable or dishonest sub-contractors; and it is only necessary to see that it is made at the beginning of the figuring to carry it through successfully.

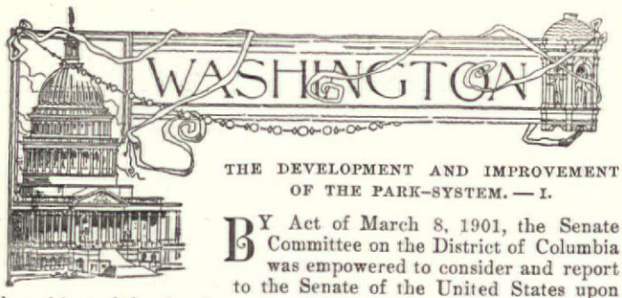
JOHN APPLETON BROWN, one of the most distinguished of American landscape-painters, died a few days ago, at the age of fifty-seven. Although Mr. Brown had long devoted himself entirely to landscape, he began his career as figure-painter, sharing a studio in Boston, when very young, with B. C. Porter, since greatly distinguished as a portrait-painter. Finding that his work did not satisfy his ambitious ideals, he gave up his studio and went to Paris, where he studied in the Louvre, and with Lambinet. He returned to Boston for a few years, but, immediately after his marriage, went to Paris again, where two of his pictures were accepted at the *Salon*. His subsequent life was spent partly in Boston and partly in New York, with an occasional vacation in Europe.

MAYOR LOW of New York has appointed, as the members of the Board of Building Examiners, whose duty it is to hear and decide appeals from rulings of the Building Department, Messrs. A. F. D'Oench, of the New York Chapter of the American Institute of Architects; Francis C. Moore, of the New York Board of Fire Underwriters; Warren A. Conover, of the Mechanics' and Masons' Exchange; William J. Fryer, of the Society of Structural Iron Manufacturers; Cornelius O'Reilly, of the Real Estate Owners' and Builders' Association, and Edward F. Croker, Chief of the Fire Department. We need not say that, except the last two, all these gentlemen have long been eminent in the science of construction, and most of them have had experience in the duties committed to them. Mr. O'Reilly is well known as a man of ability in his own province, and Mr. Croker bids fair to be a worthy successor to the earnest and able Bonner; so that the new Board of Examiners will have the confidence of the professions most interested.

AN attempt is to be made to complete the half-finished Hudson River tunnel, and a committee has been formed to float stock and bonds of a new company, formed, we suppose, by reorganizing the old one. Five per cent first-mortgage bonds are to be issued, to the amount of seven million dollars, and the rest of the capital is to be represented by three and one-half millions preferred six per cent stock, and five millions of common stock. It is said that two and one half millions of bonds will be reserved for the completion of the second tunnel, if that should be considered expedient. It is not stated whether all existing indebtedness is to be paid off, so that the new mortgage-bonds will really hold the tunnel and terminals as security, or whether, as in the case of certain railway reorganizations, the property is already mortgaged for all it is worth, and the new company merely proposes to issue seven million dollars' worth of bonds secured by an equity of no actual value whatever, but these matters will undoubtedly be explained in time. Meanwhile, it is a satisfaction to know that there is a prospect of the completion of this great work, whatever may be the financial aspects of the affair.

THE French Minister of Fine-Arts, who has, as our readers know, secured the admission of women to the Paris School of Fine-Arts, where one of them, Mademoiselle Morgan, is winning distinction in the Department of Architecture, has presented for the approval of President Loubet a much more radical measure, by which "all artists, of either sex, aged from fifteen to thirty years, whether pupils of the School of Fine-Arts or not, provided they are French, may compete for the Prizes of Rome, after passing through two preliminary examinations." It remains to be seen whether the President will sign the decree in this form, but, as a thoughtful and unprejudiced man, familiar with the wishes and needs of the provinces, it seems very likely that he may approve a measure which will not only encourage women by opening to them the highest honor which France has to bestow on students of art, but will do much to remove the reproach which the provincial cities have long cast upon the national system of instruction in art, that its benefits were restricted to those who lived in Paris, or whose families could afford to send them there. In France, where art is looked upon as perhaps the noblest of all careers, and where boys who have shown character and talent are not unfrequently sent to Paris, and maintained there during their course at the School of Fine-Arts, at the expense of their native town or village, this is a very serious matter. It has often been proposed to remedy the trouble by establishing branches of the Paris school in the principal provincial cities; but this would be a very costly proceeding, and the atmosphere of such a provincial school would not be quite the same as that of Paris; and the proposition of M. Leygues, by allowing students outside of any official school to compete for the great prizes of the Paris School, is likely to please the provincials quite as much as the establishment of local schools, while it will cost nothing to carry it out. It is, perhaps, premature to speculate on the influence of such a measure, supposing it to be adopted, on the development of French art, but it seems obvious that it would be immediately followed by the opening, in all the principal provincial cities, of *ateliers*, intended expressly to prepare pupils for the competitions for the Prizes of Rome. There are many accomplished architects, to say nothing of painters and sculptors, in France, outside of Paris, and nearly all of these would do their best to prepare pupils for a contest, victory in which would cover their teachers, as well as themselves, with glory in their own community. In some ways, the teaching in these provincial *ateliers* would be more personal and individual than it can be in busy Paris, while the pupils, taken from families who hesitated to send their boys and, still more, their girls, away to Paris, would be, undoubtedly, as intelligent as those of the official school, besides being less distracted by the excitements of the capital; so that we might expect to see, not only an occasional Prize of Rome winner from a remote private *atelier*, but, in such winners, an originality of talent which would be of great value. Notwithstanding all that is said about academic formalism and routine in the French teaching of art, there is no place where artistic originality is more quickly recognized or more highly prized than in France; and if the new system, whenever it may be adopted, should lead, as seems probable, to the introduction of new ideals and thoughts in the practice of painting, sculpture and architecture, no one will rejoice more sincerely than the great artists who make the Paris School of Fine-Arts what it is.

ONE of those miraculous dispensations which so frequently afflict the virtuous has been experienced in Detroit, where four buildings recently "fell into a heap without a cause," demolishing in their fall about a hundred and fifty thousand dollars' worth of goods stored in them. "Experts," we are told, have examined the ruins, but are unable to find any reason for the catastrophe, and it seems to be quite obvious that Providence alone is to blame.



THE DEVELOPMENT AND IMPROVEMENT OF THE PARK-SYSTEM. — I.

BY Act of March 8, 1901, the Senate Committee on the District of Columbia was empowered to consider and report to the Senate of the United States upon the subject of the development and improvement of the entire park-system of the District of Columbia. The Committee was further empowered to sit during the recess and to employ at its discretion expert assistance, the expense of such investigation to be paid from the Contingent Fund of the Senate.

The Committee has now submitted its report, which has been unanimously adopted. The Report begins by saying that the District of Columbia was created to be the seat of government of the United States and Washington was laid out as distinctively a capital city. The first consideration in its planning was the location of the public buildings and the grounds relating to them. In determining these locations each site was selected in reference to every other site. The lines of communication between the various Departments were carefully studied, and care was taken to provide not alone for convenience, but also for beauty and dignity.

The original plan of Washington, having stood the test of a century, has met universal approval. It is the departures from that plan that are to be regretted and, whenever possible, remedied.

The Report then goes on to take up the problem in detail. The area added by the reclamation of the Potomac Flats must be treated as an extension of the Mall and Monument grounds, while that part lying as an island in the river may be individually treated. Of the 170 acres in the valley of Rock Creek, acquired by Congress in 1889, and now the Zoölogical Park, and of the later purchase of 1,600 acres running north on Rock Creek to District line and now known as Rock Creek Park, the Report says simply that there are some roads, but a need of landscape treatment.

The "flats" above navigation on Anacostia Creek, 1,100 acres, should on account of the city's health and the needs of its north-eastern district be reclaimed and made a water-park. It should now be decided either to fill or park the valley of Rock Creek from its mouth to the Zoölogical Park.

The parks need development, enlargement, and to be properly connected. The existing squalor of their approaches and entrances should be cured.

Attention is called to the function of our parks in adding dignity to the public buildings and suitable connections between them aside from the matters of health and pleasure.

It is historically noted that the plan prepared under the direction of Washington and Jefferson studied the relations, in an artistic sense, between the White House and the Capitol, and the reciprocal relations of buildings throughout the city; the question of vistas and axes; sites for monuments and museums, parks and pleasure-grounds, fountains and canals. All these things were thought of by Major L'Enfant working under the direction of the first President and his Secretary of State. Great models were studied. Washington and Jefferson were familiar with the art of landscape. L'Enfant was a man of position and education and an engineer of ability. He was doubtless familiar with the great works of Le Nôtre, the master of formal landscape art.

Mr. Jefferson lent Major L'Enfant from his private library plans of Paris, Amsterdam, Frankfort, Carlsruhe, Strasburg, Orleans, Turin, Milan and of other European cities.

The plan for Washington has suffered some sad changes, but these may be remedied and it brought back to the intention of the founders. It is now time to consider and to adopt a plan which will make of Washington "the most beautiful capital city in the world."

Thus broadly and bravely is the issue set forth.

Allusion is made to the Institute's part in bringing about the Senate's action, and it is stated that the appointments of Daniel H. Burnham, of Chicago, and of Frederick Law Olmsted, Jr., of Brookline, to prepare plans were made at the instance of the committee named by the Institute to confer with the Senate Committee. Charles F. McKim and Augustus St. Gaudens became members of the Park Commission so-called, at the request of the original nominees.

The work of the Commission was at once broadened by their being consulted as to public buildings and memorials already under consideration. The officials, and many others interested, have worked cordially to assist them. The action of the Pennsylvania Railway, through its President, Mr. Cassatt, in agreeing to relinquish their grant upon the Mall — their title to which the Report says is not to be questioned — and to remove their tracks and yards and station, is most important. The road agrees to a union station — with the Baltimore and Ohio — upon a site determined and provided by legislation, with some compensation for the increase of expense involved and upon condition that the approaches to the new site be made worthy of the building erected.

This union station will be on Massachusetts Avenue, facing the Capitol, but not too near. It will be of white marble and of Classic architecture, some "100 feet wider than the Capitol" and "to be superior to any structure ever put up for railway purposes."

The station will front upon a semicircular plaza 600 feet wide, where bodies of troops and civic organizations, debarked for public spectacles, may form.

It will be the "great and impressive vestibule to Washington."

The Report adds here something which is pleasant reading. It is that the President of the Pennsylvania Railway has considered this question from the standpoint of an American citizen, saying that he appreciated the fact that if the Congress intended to make the Mall what the founders of the city intended it to be no railroad should be allowed to cross it. The greatest obstacle to a proper treatment of the problem being thus removed, the Commission entered upon the preliminary surveys and studies.

It was determined that the climatic conditions of Washington, with its usual intense summer heat enduring through four months or more, demand alleviation by means of parks and recreation grounds.

Historical allusion is made to the building of fountains in Rome by the Emperors and the Popes, to the bringing down of living streams from the hills to every quarter of the Eternal City, placing fountains and jets everywhere, cascades, "beautiful jets of water now flung upward in great columns to add life and dignity even to St. Peter's; or again gushing in the form of cascades from some great work of architect or sculptor; or dripping refreshingly over the brim of a beautiful basin that was old when the Christian era began. The Forum is in ruins, basilicas and baths have been transformed into churches, palaces have been turned into museums; but the fountains of Rome are both omnipresent and eternal."

The need of fountains in Washington is dwelt upon; and to set playing what we already have, all together, would not use as much water as the famous fountains of Trevi or St. Peter's. At the château of Vaux-le-Vicomte, near Paris, Le Nôtre built cascades, canals and fountains, using five million gallons of water daily. The fountains of Versailles remain the delight of the French people. L'Enfant appreciated the worth of water-decoration and recommended its lavish use here. The Commission adds public baths and gymnasiums, and notes the facilities for fine bathing-beaches. As to the location of public buildings, the following is advised: —

"1. Only public buildings should face the grounds of the Capitol.

"2. That new Department buildings may well be located so as to face Lafayette Square;

"3. Buildings of a semi-public character may be located south of the present Corcoran Art Gallery, fronting on the White Lot and extending to the park limits;

"4. That the northern side of the Mall may properly be used by museums and other buildings containing collections in which the public generally is interested, but not by Department buildings.

"5. That the space between Pennsylvania Avenue and the Mall should be occupied by the District buildings, the Hall of Records, a modern market, an armory for the District militia, and structures of like character."

The Mall was meant to connect the two great buildings of the Nation, the Capitol and the White House, with a broad parked avenue and to serve as a grand setting for these buildings. This idea should be restored and carried out.

The present plan brings the Washington Monument into the Capitol vista by means of a broad grassy *allée*, bordered by formal bosks of trees.

Behind these trees show the white marble buildings of the scientific bureaus, museums and like buildings. Walks and driveways shaded by elms run east and west. The streets running north and south are carried through this avenue on the surface level.

From the Capitol to the Monument is about one and a half miles. A mile or so westward of the Monument the reclaimed flats allow extension of the Mall treatment and a new great memorial on the axis of the Capitol and the Monument and near the river-bank — a memorial to Lincoln, whose is the one name in our national history which the world couples with that of Washington. The gardens to be formed west of the Monument would add impressiveness to the obelisk and bring it into axial relation with the White House, thus simply carrying out L'Enfant's idea of placing the Memorial to Washington upon the axes of the Capitol and the White House. This garden surrounded by terraces with groves of elms becomes the gem of the entire park-system.

South of the Monument extends a space devoted to out-of-door sports, to gymnasiums and playgrounds, swimming and skating pools. And here is a great *rond-point* where a monumental structure with some figure symbolic of the Republic would be proper.

The site of the Lincoln Memorial becomes the point of divergence for driveways leading southwest to the Potomac Park, for the Memorial Bridge leading directly to the mansion at Arlington and to the embankment carrying the driveway to the mouth of Rock Creek whence it continues up the valley of Rock Creek to the Zoölogical Park and Rock Creek Park. The Committee advocates parking the sides of Rock Creek, controlling and policing them, and is opposed to the project of filling-in.

For the section west of Rock Creek the plans contemplate driveways along the Potomac gorge even to Great Falls, and diagonal connections by way of picturesque valleys to the Rock Creek parks.

Park-connections are recommended east of Rock Creek Park to Soldiers' Home by way of Piney Branch, a gorge not less beautiful than the valley of Rock Creek, into which it opens, and also along Savannah Street, widened into a parkway. This latter allows a fine

reciprocity between the proposed Municipal Hospital buildings and the new structure to be erected at the Soldiers' Home.

Connections are also planned between the Home and Anacostia Creek, over wooded hills giving wide views of the city.

The swampy valley of the Anacostia should be transformed into a park for boating, swimming and skating, with encircling drives, walks and pleasure-grounds.

The use of the Thames by pleasure-craft is referred to, and also Belle Isle Park at Detroit, with shallow lakes and canals, upon which thousands disport themselves, boating or skating where was formerly only a marshy island.

This water-park with drives about it is planned for Anacostia above the head of navigation. The treatment of the navigable part, down to its junction with the Potomac, proposed is one of a walled channel and filled-in flats, with also a broad parked driveway by the river to connect Anacostia Park with Potomac Park, and a line of stone quays overlooked by terraces, as along the Seine at Paris.

The long island in the river opposite the Washington channel will be treated so as to provide shaded drives and walks along the water, with frequent boat-landings, in order to make this Potomac Park perfectly accessible to the section of the city it adjoins.

The wharves along the river-front should be rebuilt to be in keeping with the Government improvements at Arsenal Point for the Engineers' School and War College. The rentals for use will pay for this work.

There should be no slips to impede the ebb and flow of tide and force of current, but a continuous line of masonry quays.

Water Street will be broadened for a driveway between Potomac and Anacostia parks.

The models of a portion of the city, from the Library of Congress west to the Potomac, were indispensable aids to the designers, and will be guides for the carrying out of the plans, so that, no matter how long a period the work may cover, no departures from the approved designs need occur.

Numerous detail drawings were made and rendered by capable illustrators.

The plans call for systematic work, continuous over many years.

The parks and reservations are now under control of various officers and boards working duly, but not always in harmony.

For the sake of economy and efficiency a park commission should be created to control the entire park-system of the District of Columbia, national rather than local in character, and to work under the immediate control of the President of the United States.

The Report winds up by stating that it is impossible now to estimate the cost of carrying out these plans, nor is it necessary.

The procedure would be the addition of new public buildings and spaces from time to time, and of the facilities necessary to city life as fast as the need of such is realized, the work to be done within the limits of plans at once comprehensive, simple, adequate and dignified. "In such manner only can there be a development of the District of Columbia worthy of the nation."

So ends the Report of the Senate Committee on the District of Columbia which submits to the Senate the results of the study by the four artists appointed to aid them.

The Report gives the proposals in sum and with its appreciation and approval.

The Commission went abroad during the summer, accompanied by Mr. Charles Moore, Secretary to the Senate Committee on the District of Columbia, who acted as their secretary. They visited Rome, Paris, Berlin, Buda-Pesth and London and some of the smaller European capitals where examples of civic architecture are to be sought. They brought back a mass of photographic data which is now on exhibition with the rest.

The plans, sections, models, views and detail studies which accompany their Report have been arranged by Mr. McKim for exhibition at the Corcoran Art Gallery.

The maps, plans, bird's-eye views, diagrams, sections, etc., are in one room. On the hemicycle floor stand the two large models, the one of the existent Washington, its neighbor the Washington to be. Around the walls hang beautiful drawings rendered in color, of general views from several points and of details of treatment. Above them are enlargements from views in foreign cities,

One looks down upon the models from a platform. They are upon high bases, so that the eye may study them from all points and heights. Their utility is incalculable. There is a separate model, placed elsewhere in the Gallery, giving the treatment about the Washington Monument to a scale of one thirty-second.

The whole is a masterly presentation of the most important work of artistic significance ever projected in the United States. It marks an epoch in our national progress. It educates. It calls aloud for realization. It crowns gloriously the labors of this Commission and should effect their retention as a permanent board to inaugurate the plan they have conceived and to direct what the nation should do in the arts which they so honorably represent before the country.

The largeness of view shown by the Senate Committee in its conduct of this matter is instructive and encouraging.

[To be continued.]

STATUE OF ROCHAMBEAU. — Secretary Root has asked Congress to make an appropriation of $15,000 to provide for a suitable foundation, and to arrange for the unveiling of a replica of the bronze statue of the distinguished Frenchman, Rochambeau, to be erected in Washington. — *Exchange.*

BOOKS AND PAPERS

THE first time we had occasion to turn to Mr. Sturgis's just finished dictionary[1] for desired information we found our expectation denied, and that the term which escaped the notice of the staffs of the editors of the "*Century*" and the "*Standard*" had escaped his too. This is not to say that any dictionary of the three is "wanting," but merely that none contains the term "stilt-block" which, in his new "*History of Architecture in Italy*," Mr. Charles A. Cummings has such frequent occasion to use in his descriptions of the ordonnance of Byzantine and Lombardesque buildings in the north of Italy, and very possibly is a translated equivalent for the German "*Stelzblock*," or some such compound. It is in itself an excellently descriptive word, and seemingly deserves a place in an up-to-date dictionary.

Of course, the real test of the value of a dictionary is the manner, satisfactory or the reverse, in which it affords comprehensive answers to every-day questions, and though Mr. Sturgis has seemingly failed us in this one instance, we do not doubt he will in many a future case cast the rays of his greater intelligence into our unenlightened minds. It is really humiliating, after more than a quarter of a century devoted to reading a greater amount of architectural literature than falls to the share of most practitioners, to find how very limited one's own architectural vocabulary is after all. Fortunately, if one does not undertake to add to the bulk of architectural literature the work of one's own pen, a limited vocabulary is not a vital disqualification in one's life-work. It is questionable whether a Scotch gardener grows any better flowers for knowing their Latinized botanical names, or whether an architect shows less artistic feeling in his design because he is ignorant of the really proper term belonging to each member of his composition.

For real every-day usefulness, it is to be regretted that this work was not arranged on a different scheme, or, rather, that its contents were not differently grouped. There are three volumes, and the contents of each volume are purely miscellaneous in character, with only the alphabetical index on the back to inform the seeker what he is likely to find between the covers of the volume he lifts from the shelves. Now, if we may trust our observation, the contents of these three volumes easily and naturally fall into three distinct groups of approximately equal bulk. First, there is Mr. Smith's excellent biographical work, which seems to occupy at least a third of the entire space, and which, as we have said before, deserved to be presented as a biographical dictionary on its own merits. Next, there is the encyclopædic matter proper — the historical articles, the treatises on architectural styles, etc., and many longer articles, argumentative and theoretical rather than merely descriptive: these, too, seem to consume in bulk about a third of the entire printed matter. Finally, there is the remaining third, the brief descriptions of terms, phrases and processes properly to be sought in a dictionary. We feel that if the matter had been divided and grouped on this principle the owner would have found that he had three very useful volumes on his shelves, and that he could turn to one or another of them with the confident knowledge that he would not have to waste time in turning over countless pages that did not interest him before he came to the single tiny fact he was in need of. Well, the work cannot be undone, of course, but an opportunity has been wasted, and the really useful architectural dictionary, pure and simple, is still to make.

One of the excellent devices employed is the appending to a given article of a more or less complete bibliography which cites either the authorities which have actually been consulted in the preparation of the article in question, or to which the reader may turn for fuller and further illumination. But, excellent as this device is, it does not quite take the place of a bibliography indexed under subject-matter, and the very good bibliography indexed under the author's name which closes the third volume is very far from being a satisfactory substitute. Thus, if one happens to want to read up on public baths and wash-houses, he finds no bibliographic clues either under "bath" or "wash-house," and, unless chance directs his eye to "Allsop, R. Owen," in the author's index, he will be justified in feeling that Mr. Sturgis's industry has failed to provide for his legitimate needs. Prefixing this bibliography, which occupies the closing pages of the work, we find a note which declares that, of the books enumerated below, "those from which illustrations have been drawn are indicated by an asterisk," and we find that, in this graceful way, acknowledgment is made to the authors and publishers of some seventy-five or eighty architectural works of such high character that their illustrations seem to have been selected as fit above all others to illuminate this work. As a glittering generality, a general acknowledgment in the form of an asterisk may be accepted as properly symbolic, while its lack of effusive cordiality certainly does suggest the chill of stellar space. It seems as if here we stumbled upon most unfortunate evidence of ethical obtuseness on the part of a responsible some one. The manner in which the illustrations have been procured and the careless way in which

[1] "*A Dictionary of Architecture and Building*," Biographical, Historical and Descriptive. By Russell Sturgis, A. M.; Ph. D.; F. A. I. A., and many Architects, Painters, Engineers and other expert Writers, American and Foreign. In three volumes. Vol. III, O-Z. New York: The Macmillan Co. 1901. Price per set, cloth, $18; half-morocco, $30.

the proprieties of scale have been disregarded we spoke of when the first volume appeared, but it speaks volumes for the real intelligibility of the common language that architects of every nationality use, that illustrations drawn from seventy odd different books, the work, possibly, of thrice that number of different draughtsmen, can be brought together in a single publication, and not produce more unpleasant jarring of the optic nerve. There is this to be said of the method adopted by the publishers in illustrating Mr. Sturgis's work: If they had gone to the expense of preparing proper original illustrations, approximately equivalent in merit and accuracy to those actually used, it would have been necessary for them to charge at least twenty dollars per volume, in place of six dollars, and it is probably because of the manner in which the illustrations have been "conveyed" from so many different sources that the publishers have been able to fix the price for this really valuable work at a limit which brings it within the reasonable reach of every one.

The third volume, which has about the same bulk as each of its predecessors, has much more the air of a dictionary than they, particularly the second volume, had. There seem to be a greater number of entries and fewer long encyclopædic articles, more brief definitions and fewer mere dissertations. In short, it looks like a dictionary, and so invites use, and makes us all the more regret that the definitions were not segregated in a single volume. It is not at all impossible that the editor found it needful to do more pruning on the matter prepared for this volume, if it were to be compressed into the limits fixed by the publishers, than seemed necessary or desirable in the earlier volumes. This is a fate that is common to all such undertakings. Planat's remarkably valuable "*Encyclopédie de l'Architecture et de la Construction*" proceeded in a most acceptable and satisfying manner through five volumes, the treatment in one being identical with that in the others, and then the publishers seem to have noticed for the first time that the editor had reached only the letter N. Then the screws seem to have been applied, and the remainder of the alphabet was disposed of in a single volume in a much less satisfactory manner. Mr. Sturgis has known how to plan his work better than this, and his final volume does not exhibit the enforced omissions and undesirable suppressions which M. Planat had to endure. Whatever condensation this third volume had to undergo has been distinctly to its advantage.

The volume is not altogether devoid of encyclopædic articles; they are only shorter. Mr. W. P. P. Longfellow rounds out the subjects treated by him in the second volume with papers on "Romanesque Architecture" and the "Round Church," while Mr. R. Phené Spiers writes of "Roman Architecture" and, again, of "Syria," topics both of which his extended travels admirably fit him to deal with. When Mr. C. H. Blackall held the first Rotch Travelling Scholarship he was particularly interested in the architecture of the Iberian Peninsula, and it was natural he should select "Spain" and "Portugal" as the subjects he would contribute to this *magnum opus*. Professor Frothingham supplements his interesting article on "Italy" in the second volume with a similar article on "Sicily" in this one, and Professor Hamlin deals with architecture as widely variant as is implied by the headings of his two contributions, "Persia" and "Scotland." Montgomery Schuyler writes the article for "United States," devoted largely to the earlier architectural developments, since so much that is modern has been treated under other headings, as "Office Building," "Synagogue," "Church," "Hotel," "Theatre," and so on. Mr. Sturgis himself treats the architecture of sundry other countries, seemingly those which he could find no one else particularly desirous of handling. But in no case have these historic articles the expansion and comprehensiveness of the similar articles in the second volume.

Among the longer articles, not primarily historic in character, may be cited Mr. E. M. Wheelright's paper on "Schoolhouses" and Mr. George P. Merrill's on "Stone," contributions both of which may be accepted as coming from competent authorities, and so, too, may Mr. La Farge's paper on stained-glass under the general heading "Window."

Some things in the volume strike us as a little singular. No one writes more delightfully or suggestively than Mr. Henry Rutgers Marshall, but the points he makes and the views he advances are so personal to himself that the reader feels himself invited to an immediate discussion with him of the point at issue. Now, one can sit down to discuss, even to answer, an essay in pamphlet form, but who would ever think of answering an article in an encyclopædia? and his essay introduced under the heading "Preliminary Studies" is just one of those things that afford many chances for discussion and controversy, and so, being largely debatable, are a little out of place in a dictionary. For instance, we do not feel at all sure that it is "self-evident that a building which is beautiful only to the technically trained architectural translator, and not to the average highly cultivated man, is not a work of architectural art at all."

In a different way, while we may be very glad to know what Mr. George L. Heins has to say, we think that no one would ever search for it under the heading "Refinements in Design," and we feel quite sure, further, that no such heading, quite regardless of the matter to be found under it, is ever likely to be sought under the letter R.

Another editorial vagary seems to be the placing of Mr. Walter Cook's interesting account of the Prix de Rome not under that title, but under the heading "School of Architecture."

It may seem unreasonable to complain because a dictionary has no index, but this work is in crying need of an index to its illustrations, and all the more because of the singular way in which the editor has chosen to title his plates, the specific title of the subject being quite lost to sight, being seemingly grudgingly mentioned at all.

Some four or five years ago we wrote with warm approbation of the "*History of Architecture*,"[1] prepared as a text-book for the schools by Professor Banister Fletcher and his son, and the frequent use we have made of the book in the intervening time has proved that we did not mistake its useful character. There are not many architectural books which a publisher finds there is profit in reprinting, but this one of the Messrs. Fletchers' ran through three editions — of unstated size be it said. It is fair to grant that but for its adoption as a text-book by colleges and schools of art and by University Extension lecturers, it would probably not have had an unusual sale, but its very adoption by these institutions is proof of its worth. The second and third editions were reprints of the original.

Finding the work was "a seller," the younger man, after the death of his father, resolved to revise and amplify the divisions of the original work while adding a considerable chapter, or division, on the non-historic styles — Indian, Chinese, Japanese and Saracenic. Fortunately, he found his publisher, Mr. B. T. Batsford, ready to meet him more than half way, and the result of their combined efforts is one of the most notable new editions that we can recall. The book, which was originally a small octavo, now appears as a medium octavo containing some two hundred more pages than were in the original, and exhibits a larger and fairer page of print than did the first edition, although that exhibited a more agreeable face than do most books of the kind.

Although very considerable additions have been made to the text-matter, the enlarged size of the book is due mainly to the increase in the number of the illustrations, which now occupy 256 plates, one half of which are half-tone prints from photographs, while the other half exhibit in compact form 1,300 illustrations so skilfully arranged that each plate, in place of being a mere hodge-podge of dissociated and mutually interfering forms, has generally a most attractive air. In some cases the grouping and balance of the cuts on the plate could not be improved, and the draughtsman, whoever he is — and he deserves to be known — has evidently given so much thought to securing a properly balanced effect, and has so generally succeeded, that it may be taken for granted that in those cases where he has failed could no one else have succeeded better. The manner in which these line-drawings have been prepared is wholly admirable, and the only ground we have for complaint is that the necessary descriptive titles and remarks are lettered on the drawing in open lettering, and, as a rule, fill up all available blank spaces. The result is that some pages have a bewilderingly dizzy aspect, and the student cannot at once determine which is the illustration and which the explanatory text. It is rather regrettable that the printer, who has done his part of the work with such typographical excellence, was not allowed to title these prints. But the really remarkable thing about these plates is that the illustrations in the first edition have not been simply reproduced at the larger scale of the new edition — they have been redrawn, and very materially improved in the process. That word "process" reminds us how greatly the art of making half-tone process-plates has improved in the last few years: the process-plates in this edition are, as a rule, far more satisfactory than the collotypes used in the first edition.

We must also point out one further particular in which author and publisher have used their intelligence for the public good. They are ready to furnish these illustrations to schools and lecturers either in the shape of lantern-slides or lecture-diagrams, 27″ x 40″ in size.

Comparisons are uncomfortable things to institute, but we really wish the publishers of Mr. Sturgis's "*Dictionary of Architecture*" would get a copy of this book, for we believe it would be an object-lesson, and that they could learn from it that there is a proper as well as an improper way of providing architectural illustrations.

With all that we have said in favor of the illustrated portions of Mr. Fletcher's work, we must complain that some one has again displayed rank stupidity in not providing an index of illustrations. We have a "list of illustrations" arranged in the ordinary silly form of a list printed in the order in which the cuts happen to be paged in the book, but there is no possible way of putting one's finger on a desired illustration save by hunting at random for it. This is all the more irritating because the "list of illustrations" is in itself admirably arranged in certain particulars, and it only needed a slight exertion of common-sense to throw the present meaningless arrangement into a sensible and self-revealing alphabetical sequence.

The character of the work itself can be noted from the following extract embodying a comparative statement of the characteristics of French and English Gothic: —

4. COMPARATIVE.

Amiens Cathedral (No 120) is the most characteristic French cathedral, in the same way as Salisbury (No. 120) is considered to be the most typical English cathedral.

---

[1] "*A History of Architecture on the Comparative Method*" for the Student, Craftsman and Amateur. By Prof. Banister Fletcher, F. R. I. B A., and Banister F. Fletcher, A. R. I. B. A. Fourth edition, revised and enlarged, with 256 plates, comprising 1,300 illustrations. London: B. T. Batsford. Imported by Charles Scribner's Sons, New York. 1901. Price, $7.50.

FRENCH GOTHIC.

(*a*) *Plans* (No. 120). — Short, wide and high. Length about four times the width.

In the south richly designed cloisters are frequently met with, otherwise they are rarely found.

Transepts have slight projection, as may be seen in the sheet of comparative plans (No. 116).

Large number of side chapels, due to the popular character of the Cathedral as compared with the Abbey.

The circular apse is developed into *chevet*.

Läon, Dol and Poitiers are notable exceptions.

There are sometimes double aisles, as at Notre Dame, Paris (No. 118), Le Mans (choir), Bourges, etc.

Two western towers (Nos. 115, 122 and 123) characteristic, the probable reason being that the great height of nave prevented a central tower to be constructed

Compare central *flèche* at Amiens (422 feet high) (No. 126 B).

In Normandy, central spires are common.

The French attempted to combine many towers, placing four at the internal angles of the transepts, and two at the west end, with central *flèche* only, as at Läon, Amiens (Nos. 115 A and 126 B), etc.

Wide spacing of arcading and general largeness of parts. No polygonal chapter-houses.

(*b*) *Walls.* — Early buttresses developed from the slight projections of the Romanesque period. They are sometimes semicircular columns attached to the walls, especially in the apses of churches. Later buttresses have chapels between them (No. 118).

Flying-buttresses are common, and are used with special effect at the east end. They are largely employed, being necessary on account of height and width of aisles and naves.

Offsets to buttresses are flatter as they are higher. Buttresses often nearly vertical, without offsets (No. 114).

Interiors owe their effect largely to their extreme height, otherwise they are considerably less ornate than the English examples.

Open tracery parapets occur (Nos. 125 and 126 C, D).

Characteristic west front is Notre Dame, Paris (No. 117).

(*c*) *Openings.* — Doorways elaborate and rich, larger and finer than the English, and deeply set in west fronts, as at Coutances and Notre Dame, Paris (Nos. 117, 122 and 123).

Windows have much "plate" tracery, "flamboyant" tracery final development.

Notice the absence of cusps in late French tracery.

Large circular windows in west fronts (Nos. 117 and 121), and transept ends (No. 114 B), with intricate tracery, are a special feature.

(*d*) *Roofs.* — Roofs always steep and ornamented (Nos. 115 and 125).

Slates often employed. Construction with double timbers of special type to surmount high vaults.

Early development of the vault, which is specially characteristic of the style. A striking feature of the "flamboyant" or later period is the frequent use of pendants in vaulted roofs.

ENGLISH GOTHIC.

(*a*) *Plans* (No. 120). — Long, narrow and low. Length about six times the width

Cloisters frequent, owing to monastic foundation, and characteristic of English cathedrals.

Transepts have bold projection, and a second eastern transept is found, as at Salisbury, Lincoln, etc.

Small number of side chapels, due to the fact that the principal cathedrals were churches belonging to monastic foundations.

The square east end characteristic. The "Nine Altars" at Durham as an east end transept is remarkable.

Practically always single aisles; Chichester is the only example to the contrary (see page 216).

The central tower the most successful and predominant feature, as Lincoln (Nos. 88 B and 94), Canterbury, Durham, York, Ely and Gloucester (No. 88).

A single western tower is characteristic of parish churches.

The English were content to group three spires, placed on a central and two western towers, as at Salisbury (Nos. 88 A and 90), Chichester (No. 86 A), and Lichfield (No. 88 F.)

Close spacing of arcading and smallness of parts in main features. Polygonal chapter-houses typical.

(*b*) *Walls.* — Early buttresses are flat projections. Later ones are much pronounced, and strongly marked with offsets and pinnacles.

Transitional buttresses may be seen at Salisbury with curious weathering.

Flying-buttresses, although occurring in many examples, are not so prominent a feature because the clerestory is kept comparatively low.

In the absence of the *chevet*, these features are somewhat unimportant in the general effect.

Offsets to buttresses are steeper as they get higher. In the later periods, highly ornamented with niches and panelling.

Interiors are ornate, owing to elaboration of the triforium, complex pier arch mouldings, variety of clerestory treatment and richness of the vaulting.

The battlemented parapet predominates (No. 111 M).

Characteristic west front is Peterborough (No. 87 C).

(*c*) *Openings.* — Doorways more simply treated and placed in less important position on south front, and often provided with a separate porch, elaborate and characteristic — Salisbury, Canterbury, Lincoln (No. 94), etc.

Windows develop on the same lines, but "plate" tracery seldom used, "perpendicular" tracery final development, and especially characteristic of English work.

Circular windows are not much used in England, but are found at Westminster and Durham.

(*d*) *Roofs* of moderate pitch, approaching to flatness in later periods.

Lead coverings generally employed. Carpentry is more advanced. Single framed timbers are used

Ornamental wooden roofs were more highly developed than in France (No. 85). Fan-tracery vaulting (Nos. 84 and 99) peculiar to England.

FRENCH GOTHIC.

French vaults are usually domical, and ridge ribs are rarely employed. Very slight development in vaulting takes place. Intermediate and lierne ribs seldom used. Compare Gothic vaulting (page 188), (Nos. 81 and 84).

Extreme height, as at Amiens, which is 140 feet (No. 121).

The joints of the web (or infilling) are at right angles to the wall ribs (No. 119).

(*e*) *Columns.* — Plain circular nave columns are characteristic, as in Notre Dame, Paris (No. 126 H).

The use of columns seems due to Roman tradition; the capitals have foliage of the Corinthian type. There was a difficulty in bringing down the lines of the vaultings with this type, and we find clumsy expedients in use, as when the shafts started just above the square abacus of the arcade columns (No. 119). In the south is found the square pier with attached half-columns (No. 126, J, K, L).

(*f*) *Mouldings.* — Less bold and rich. Often kept some distance from window-openings.

Early application of stiff leaf foliage to capitals, classic type of foliage lasting well into the period (No. 126).

The square abacus is a great French feature (No. 126 G, H). The moulded "bell" capitals without foliage rarely met with, except in Normandy. The Crocket capital (No. 126 P, Q) a characteristic feature.

French work being on a larger scale, features are rougher, and less attention is paid to detail.

(*g*) *Ornament.* — Decorative figure sculpture best exemplified at Chartres (No. 126 A), and Notre Dame, Paris. Carving of animals and birds also much used (No. 126 G.

In early stained-glass there was a fine development, Chartres possessing so many examples as to give an idea of the general effect of an interior, when completed, according to the intent of the artists of the epoch. Depth and strength, in a prevailing tone of blue tending to violet, is the impression produced. Color work seems to have fully developed, and it would appear that hangings were imitated in painted wall-decorations.

ENGLISH GOTHIC.

English vaults have level ridges and have ridge ribs in both directions. A heavier section is employed, and this backbone, given to the vaulting by such ridges, may be traced to the influence of carpentry (No. 83).

The joints of the web are often parallel to the wall rib or at right angles to a dividing line, starting from the angle of the compartment to the centre of diagonal.

(*e*) *Columns.* — The clustered shaft is a special feature (No. 112).

The early adoption of shafts as expressive of the vault lines and the composition of them, being taken as the basis of the pier, avoids any such difficulty (No. 92).

In France, however, the mouldings of the pier arches often die into the pillars without capitals, as at St. Lo. In England the development of moulded piers was a final feature.

(*f*) *Mouldings.* — A special striving for the development of mouldings in capitals and arches.

The moulded bell capital obtains in England (No. 112), but early carved caps are notable (No. 113), having stiff-leaved foliage.

The English abacus is round or octagonal as a rule (No. 113).

The "dog-tooth" ornament (No. 111 A) so common in the Early English period of Gothic architecture does not occur in French work.

The small scale of English work led to greater refinement and attention to detail.

(*g*) *Ornament.* — English decorative sculpture is best seen at Wells, Lichfield and Westminster, the west front of the former being perhaps the most complete in England.

The few early windows of Canterbury (see under E. English) remain as a proof of the capabilities of the style. The development of painted glass is explained under each section in the chapter on English Gothic.

Color appears to have been applied to sculpture. In the early period it probably followed on French examples. The colored roofs of the perpendicular period are notable.

THE HERMES RECOVERED NEAR ANTICYTHERA.

LAST March, through the kindness of Professor Richardson of the American School at Athens in sending me two Athenian papers, I was privileged to give the readers of the *Transcript* a detailed account of the remarkable find of statues at the bottom of the sea near the island of Anticythera, off Cape Malea. The best of these was a splendid bronze statue, preserved practically entire though in fragments, and now generally called a Hermes.

The recovery of the shipload of works of art so strangely preserved for us by the sea-god has been going on since that time, though a report early this fall stated that operations were hindered by a rock which was too large to be removed by the means at hand, but was to be blown up with dynamite.

Meanwhile, the fragments at Athens have been cleaned, and the Hermes partly restored, though but temporarily, for few men have the skill and experience requisite to the task of successfully fitting together a large number of pieces of bronze. Various propositions have been made to and by the Greek Government. One of these, strangely enough, came from Turkey. Through Mr. Mavrokordatos, the Greek Minister at Constantinople, Moustapha Bey, the best sculptor connected with the Imperial Museum in that city, expressed his desire to be allowed to undertake the piecing together of the Hermes. The Greek Ministry at Athens, before accepting the proposition, directed Mr. Mavrokordatos to seek further information about this sculptor. The Government also wrote, through Mr. Kabbadias, Ephor-General of Antiquities, to a sculptor at the Louvre, asking him to come to Athens and undertake the work. The result of this overture I have not seen reported, but, at the request of the Greek

Government, Herr Wilhelm Sturm, the restorer of the archæological collections of the Imperial Palace at Vienna, was permitted to come to Athens in October to give his expert opinion on the restoration of the statue.

A friend at Athens has sent me a clipping from the *Asty* containing his official report to the Minister of Ecclesiastical Affairs and Public Education, Mr. Staes, in whose department is included the care of antiquities.

After a formal introduction, he states, as a result of careful examination, that the bronze fragments of the statue are sufficiently strong and thick to endure the process of fitting together. Moreover, the missing portions of the trunk are so few and so unimportant that no difficulty will be presented in restoring the statue to its original form.

He has much praise for the work already done on the Hermes, saying: "I ought not to omit to mention with commendation that this most happy result, which will enrich the collections of the National Museum by a masterpiece of bronze sculpture, is due in the first place to the exceptional foresight and care with which the cleaning and preservation of the fragments, and, in general, of all the bronze finds, were carried out in good season by your Ministry. I am glad to be able to express my opinion that the method employed, which was the only one that could check the progress of dissolution which had begun, is shown to be wholly equal to the possibilities of the art to-day, and the future restorer has nothing more in this respect left him to do."

Herr Sturm then goes on to describe the method of restoration as follows: "In fitting together the statue the experience will be useful which was gained in the case of the large bronze statue of an athlete from Ephesus which is now in the collections of the Imperial Palace in Vienna. The method is this: the fragments are bound together on their inner surface by strips of brass and screws of the same metal, and in such a way that the latter do not project at all on the outer surface, but rather are rendered entirely invisible by the coating of patina. When the preserved fragments have been thus bound together, the hollow form of the body thus formed is fitted by brass pins upon a skeleton of tinned iron extending through the trunk, arms and legs.

"However, since we must provide against changes resulting from the chemical action between the metallic parts thus bound together, even when the statue is unmoved, not to speak of earthquakes, and also against the appearance of new breaks, it is quite necessary that the hollow within the statue should be filled with a solid core.

"As I regard metal unsuitable for this, I make use of a cement invented by myself, which, besides the relatively small weight, presents also the advantage that as soon as it hardens, because it absorbs no moisture, it becomes absolutely solid. Where this projects on the surface because parts of the statue are missing, it is easily fashioned, and by a special process and coloring is made like the metal in texture and shade.

"For setting up the whole there will be considered a bronze base, in which, without technical difficulties, a hollow can be made corresponding to the leaded projection at the lower extremity of the leg, on which the statue stands."

Herr Sturm expresses his earnest desire to perform himself the task of restoring the Hermes, but the work would require six months' time, and two more must be added which the core of cement needs to dry completely. His duties at Vienna are such that he does not expect permission for a longer absence, and so cannot undertake the work if it must be done at Athens. If, however, the restoration can be made at Vienna, he already has permission to give his time and attention to it there. The objections to the removal of the precious find to the Austrian capital he thinks of no weight compared to the advantages of this plan. The transfer of the fragments can be made without the least danger, for there is hope that through the influence of the royal Government permission will be given by the railroad and steamship companies to those in charge of the statue to manage themselves all necessary transfers, and to keep the boxes under their surveillance all the time, travelling in a private compartment. In Vienna the precious statue will be deposited in the private rooms of the Imperial Archæological Museum immediately on arrival, will be accessible to no unauthorized person, and will have the same protection as is furnished to the treasures of the Imperial Palace, and of this both the Greek representatives and especially His Excellency Mr. Manos, the Greek Ambassador at the Imperial Court, may be assured.

Another reason why it is better that the work should be carried on in Vienna is that in the workrooms of the Court Museum are all the appliances, some very expensive, which were tested in the work on the bronze statue from Ephesus. And perfect and approved tools are so much the more necessary as he would feel obliged to prepare everything required for the work, even to the last screw, with his own hand. The loan of the tools of the imperial workrooms is absolutely forbidden, and it will be difficult to have perfect ones made at Athens. So on this account he urges most strongly the transfer of the Hermes to Vienna.

The proposal that the work be done at Athens by local artists under his oversight he deems unwise, for though he would gladly give his services, and even supposing permission for his absence from Vienna were granted, he would be hardly more than an adviser, and could not do the work with his own hand. The Athenian workmen lack his experience, and the statue might be sadly injured by experiments on their part, while the metal might be weakened by boring new screw-holes to rectify mistakes he might discover.

Notwithstanding Herr Sturm's arguments, the Greek Government is still naturally reluctant to allow the Hermes to leave the country, and has made an effort to secure this expert's personal services in its restoration at Athens, requesting the Austrian Government to permit his absence for the necessary time. This effort seems to have been successful, for the New York *Atlantis* of Nov. 1 contains the following item: —

"The Directors of the Austrian Archæological Institute have announced by telegram to Mr. Kabbadias, the Ephor-General of Antiquities, that permission has been given to Herr Sturm to come to Greece to put together the statue of Hermes, the expenses of his journey being assumed by the Austrian Institute in grateful acknowledgment of the help which the Greek Government furnishes its representatives in Athens."

The last number of the *Jahrbuch des Kais. Deut. Inst.* (*Archäologischer Anzeiger*, page 148), under the date of Oct. 17, gives a good picture of the bronze statue of the athlete from Ephesus mentioned above. This is of life-size, representing an athlete anointing himself, and was put together from more than two hundred fragments. It stands, with other pieces from Ephesus, in the so-called "Theseustempel" in the Volksgarten at Vienna, where Canova's group of Theseus and a Centaur formerly stood.

In the last issue of the *American Journal of Archæology* (Vol. v., No. 3, page 339) is a list of the articles on these finds off Anticythera. — *Arthur Stoddard Cooley in the Boston Transcript.*

SOCIETIES

WASHINGTON CHAPTER OF THE A. I. A.

WASHINGTON, D. C., January 27, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sir, — The enclosed printed matter was endorsed by the Washington Chapter of the American Institute of Architects at a meeting held January 25, 1902.

I have been asked to forward you the same and request its publication. Yours very truly, F. B. PYLE, *Secretary.*

We, ——— ———, a Society interested in the development of architecture and art in the United States, understanding that legislation is proposed changing the title of Architect of the U. S. Capitol, apparently upon the theory that the services of a trained architect are not required, and that the services which might be rendered to the country and Congress by a trained architect are not needed in this official, respectfully request careful consideration of the following preambles and resolution before any action is taken in the matter: —

Whereas, The title of Architect of the U. S. Capitol is an honorable and historic title which has been in existence one hundred and ten years, the position has only been held by such honored architects as William Thornton, B. H. Latrobe, Charles Bulfinch, Robert Mills, T. U. Walter, and Edward Clark; and

Whereas, The various incumbents have been of great service to the Government of the United States in the growth of the building on artistic and harmonious lines, and of great service to Congress as consulting-architect on various buildings, monuments, statuary, and matters of construction which have come before Congress for consideration for over a century; and

Whereas, At the beginning of the twentieth century the contemplated artistic development of Washington, submitted by the Park Commission, will make it more important that the building should continue to be developed in harmony with the present structure and in keeping with the best artistic and architectural practice of the country, and Congress will have greater need for a trained consulting-architect with the contemplated improvements of Washington before them for consideration and development; and

Whereas, The constant increase in the architectural knowledge among the people of the United States demands that the building in which, more than any other, all take a natural pride shall be developed in accordance with the highest standard of architectural art; and

Whereas, It is the rule among the most enlightened nations of the world unfailingly to place an architect of high attainments in charge of all monumental buildings; and

Whereas, The officer in charge will be almost daily called on for advice relating to design, construction, decoration, and sanitation, and only a trained architect will be able to give advice that will be of the best service to Congress and the country at large; and

Whereas, It is possible that even now work is in progress that may prove detrimental to the dignity and refinement of the building, and may ultimately have to be removed to make it in keeping with the building and good architectural practice: Therefore, be it

Resolved, That our Association, in the interest of the Capitol building and its continued development on harmonious and artistic lines and proper methods of construction, earnestly ask that the title be not changed; that the work in progress on the building be examined by competent experts who shall report to Congress, and that the President appoint an architect at as early a date as possible.

ANTIQUITY OF CUNEIFORM INSCRIPTIONS. — The archæological discoveries of M. de Morgan at Susa are throwing much light on prehistoric civilization. In the Anzanian capital, destroyed in B. C. 640, M. de Morgan found many inscriptions which proved that writing in the cuneiform character was introduced from Babylonia probably about B. C. 3800, when Elam was conquered and annexed by the Semitic rulers of Chaldea. — *N. Y. Evening Post.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

"VENTFORT HALL," LENOX, MASS. MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

"SHOREBY," THE SUMMER HOME OF SAMUEL MATHER, ESQ., SHORE OF LAKE ERIE. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

A COMPETITIVE DESIGN FOR THE ROSWELL P. FLOWER MEMORIAL LIBRARY. MESSRS. BRUN, HAUSER & LAPOINTE, ARCHITECTS, NEW YORK, N. Y.

PUBLIC LIBRARY, THOMPSON, CONN. MESSRS. GAY & PROCTOR, ARCHITECTS, BOSTON, MASS.

THE library building at Thompson is in gray stone, Spanish red tile roof, quartered-oak finish and floors, plate-glass windows; interior richly decorated in color; books on steel stacks; steam heat, open plumbing. There are reading, periodical and book rooms, librarian's room, toilet, etc., lift, basement to attic; storage, and opening on ground-floor into book-room; main entrance-hall, high-domed ceiling. All rooms high and with coved ceilings. Fireplace in reading-room. Cost, $18,000.

[The following named illustration may be found by reference to our advertising pages.]

THE HUNGERFORD MEMORIAL BEDE HOUSES AND FREE SCHOOL, CORSHAM, WILTS, ENG.

THIS plate is copied from the *British Architect*.

[Additional illustrations in the International Edition.]

THE MAIN FRONT: "VENTFORT HALL," LENOX, MASS. MESSRS. ROTCH & TILDEN, ARCHITECTS.

THE GARDEN FRONT: "VENTFORT HALL."

HOUSE OF J. W. MCCLYMONDS, ESQ., MASSILLON, O. MR. CHARLES F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

COMPETITIVE DESIGNS FOR THE FACADE OF SAN LORENZO, FLORENCE, ITALY. SUBMITTED BY MESSRS. R. SABATINI, C. BAZZANI, E. COLLAMARINI, G. CALDERINI.

NOTES AND CLIPPINGS

MUDDY WATER AND AUTOMATIC SPRINKLERS. — Muddy river-water and sprinklers are incompatibilities, as was seen the other day when the soap-works and refinery of the Union Oil plant at Gretna, opposite New Orleans, took fire. The resultant damage was serious. The risk was equipped with sprinklers. It was, therefore, a surprise all round that the loss should have been so heavy. An investigation proved, however, that the sprinklers had been rendered useless by a deposit of mud. The heads were pendant, and, therefore, collected mud more readily than upright heads would have done. Many of them were so stopped up as not to operate, and all of them were, no doubt, so delayed in operating as to cause the disaster which has so disappointed the underwriters. The Mississippi river-water bears so much silt that pendant heads after having been in use a few years are practically valueless. — *Fire and Water*.

INTERESTING ELECTRICAL-DAMAGE SUIT IN IOWA. — A customer of Swift & Co., the meat-packers of Chicago, was recently killed by the electric current while in one of the firm's cars at Cedar Rapids, Ia., and a suit for $15,000 damages was begun by his widow against Swift & Co. and the Cedar Rapids Electric Light and Power Company. The case against Swift & Co. was brought to trial first, and the jury awarded damages in $2 000. As the verdict was undoubtedly a compromise, the case will be appealed by the defendant company. The testimony showed that Swift & Co. deliver every morning in Cedar Rapids a refrigerator-car of beef, which is run on a side-track near their office. Here the local retail-dealers come to select their meat. The Cedar Rapids Lighting Company furnishes light all over the city, using a 1,000-volt alternating current, which is reduced to 100 volts in the usual manner. The office of Swift & Co. was lighted from a transformer supplying electric-light to a number of customers. There was also a circuit run from Swift's office to an upright near the track, to which, by means of socket and plug, a flexible-cord connection could be made and light carried into the car. The lamps used, in order to prevent breakage, were provided with wire guards. On June 10 last, there was a heavy thunderstorm early in the morning, and a number of persons were shocked, more or less severely, by touching exposed metal parts of circuits when they were standing on the ground or in damp basements. At about 8 A. M. on that day, Mr. Martinek, a customer of Swift & Co., entered the car as usual to select his meat. He held the lamp in his right hand, and when passing it to his left hand, received a severe electrical shock, which resulted in his death a few minutes later. The suit was begun by his widow, the claim being made that his death was due to the fact that the wires of the secondaries at Swift & Co.'s premises had been grounded. Experts from Chicago testified that the grounding was not only permitted by the underwriters, but would be an absolute safeguard as to protection of human life against the high potential current. They declared that the cause of death was due to Martinek's stepping on the king-bolt in the car in his wet boots, which established a connection between the main wire and the ground, sending the high-voltage current through his body. It was shown by witnesses that there was a leak in the transformer, caused by a crack in its cover, through which the water had leaked, and that there must have been a leak on the other side of the primary, which sent the deadly current along the wire. The Company's experts testified that the electric company alone should be liable, and have made this statement to the *Western Electrician*: "It is to be hoped, in the interest of life and limb of consumers of electric-light, that an appeal will be taken, as otherwise a very bad precedent would be established. It goes without saying that the electric-light company should be made absolutely responsible to guard against the entering of the high potential into the secondaries, and should provide safeguards, so that if such an entrance should occur, the dangerous potential should at once be relieved. The latest underwriters' rules recognize these facts, and permit the grounding of the secondaries by permanently grounding the centre of the secondary coil in the transformer; but, of course, it is easily understood that the grounding of any other point of the secondaries, intentionally or accidentally, would be an absolute safeguard to human life against the high-tension current. If the verdict as given should stand, it would simply mean that if a citizen invites a friend into his house and he should by accidental contact with a socket get a fatal shock, under circumstances similar to the ones explained, the host and not the electric-light company would be responsible for his death, if it could be shown that the wiring of the building in which the accident occurred should have been a little defective in some minor points. The absurdity of such a proposition is, of course, apparent to every electrical man, and it is to be hoped, in the interest of the protection of human life, that the Supreme Court of Iowa will reverse the verdict." — *N. Y. Evening Post*.

A SUCCESSFUL WAVE-MOTOR. — The *Scientific American* says that the "city of Santa Cruz, Cal., owns what is perhaps the only practical and efficient wave-motor in existence to-day, and it has stood the test of four years' operation. At a point unprotected by outlying rocks or shoals," it continues, "two wells 8 and 5 feet in diameter, respectively, were sunk in the cliff, one behind the other, the foremost but 5 feet from the brink. These wells extended from 30 feet above high tide to below the ebb and opened at bottom in the ocean. The simplicity of the motor precludes a lengthy description. A counterbalanced float rises and falls between vertical guides in the foremost well as the swells outside raise or lower the water-level. The plunger of a common force-pump working in any part of a long pump-barrel occupies the second well, forcing on the down stroke the salt water vertically 125 feet to a 5,000-gallon tank raised on a 60-foot derrick on the bank above, from whence it runs to tanks along the country roads for miles around and is used for sprinkling purposes. In ordinary weather the pump fills the supply-tank in about one hour. The surplus will also shortly be utilized in the manufacture of salt. But to return to the motor, however. A 35-foot, 4-post derrick carries the vertical guides for pump and float, which are fastened at and near the outer end of a 12-inch round timber 60 feet in length, the butt counterbalanced on the bank over two small iron car-wheels rolling on a short track, and thus allowing the timber to recede and advance as well as to oscillate as its outer end follows the vertical guides. The stopping and starting contrivance, however, caps the climax for simplicity. A strong chain leads from the outer end of the beam above the float over two sheaves at the top of the derrick, and suspends a large barrel in vertical guides at the side. To stop the motor the barrel is filled with water from a short garden-hose attached to a convenient connection from the tank. The weight of the filling barrel gradually overbalances the float, raising it above the waves. When the motor is to start a plug is pulled from the bottom of the barrel and the float gradually goes into action."

EXCAVATIONS NEAR CAIRO. — Robert Sewall is to leave England in a few days for Egypt, where, under the guidance of his friend, Professor Flinders Petrie, he will undertake, near Cairo, a series of excavations. Certain outside reasons exist for believing that a Buddhist mission went from India to Egypt about 250 B. C. No trace has been there manifest; but Mr. Sewall, whose archæological discoveries in India are well known, is to set about digging not very far from Cairo, with a fairly confident heart. He is wished all good luck in his adventure by a large circle of friends, who include his uncle, the venerable Warden of New College, Oxford. — *London Chronicle*.

THE GROWTH OF THE PRACTICE OF CREMATION. — Statistics show that there are now twenty-six crematories in the United States and one in Canada, and that while the number of incinerations in 1884 was only 16, that in 1900 was 2,414. Prior to the year first mentioned and beginning with 1876 there were only 25. — *N. Y. Tribune*.

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, FEBRUARY 8, 1902 No. 1363

CONTENTS

SUMMARY: —
The Stand in the Matter of Prices taken by the U. S. Steel Co. — The Advantages of Dealing with strong Contracting Firms. — Chicago Coal Teamsters boycott Natural-gas Consumers. — The new Stone Bridge Arch in Luxemburg. — The Westinghouse Electric Co. builds at Manchester, Eng., employing "American Principles." — Open-air Sanatoria. — Prohibiting Sky-signs in New York. 41
NOTES ON IRON AND STEEL CONSTRUCTION. — III. 43
THE DEPARTMENT-STORE RISK. 44
A LETTER OF MAJOR L'ENFANT'S. 46
GREAT CANALS OF THE WORLD. 47
ILLUSTRATIONS: —
United States Post-office, Clinton, Iowa. — Pavilion-detail of the same Building. — House for Water-tower No. 3 and Hook-and-ladder Truck No. 24, New York, N. Y. — The Parlor: House of C. C. Febiger, Esq., Philadelphia, Pa.
Der Neunerthor, Salzburg, Austria.
Additional: House of Robert S. Peabody, Esq., No. 22 Fenway, Boston, Mass. — Fraternity House, University of Pennsylvania, Philadelphia, Pa. — The Garden of C. C. Febiger, Esq., Philadelphia, Pa. — Window Detail: United States Post-office, Clinton, Iowa. 47
NOTES AND CLIPPINGS. 48

THE United States Steel Corporation, which, like all the Morgan properties, reports its business clearly and fully to its stockholders, makes a very interesting statement of its recent operations. Its policy, as was promised at the beginning, has been, instead of forcing up prices, to hold them at a reasonable level, with the idea that consumption would be more encouraged by the prospect of stability in prices than by arbitrary fluctuations, even in the direction of reduced cost; and it is said that offers of more than the established prices, for quick delivery, have been refused, the Corporation preferring to treat all its customers alike, both as to delivery and price. This fair and honorable way of doing business has had its natural result, in a steady and large demand, which bids fair to continue. That prices are high there is no question, for, in the seaport cities, foreign structural steel is beginning to be imported in considerable quantities, in competition with the home product, although it has to pay a duty of more than a hundred per cent, besides the cost of transportation, interest and insurance. In fact, as Pittsburgh steel has been extensively sold in Europe in competition with that from the English and German mills, it is not at all impossible that some of the beams imported into Boston and New York may have been made in Pittsburgh, carried four thousand miles to London or Hamburg, brought four thousand miles back again, and sold here, including cost of transportation both ways, interest, insurance and charges, and about one hundred and forty per cent duty, for less than the same would cost sent directly from Pittsburgh. It is true that the difficulty of getting prompt delivery of iron from Pittsburgh, and the prevailing low rates of ocean freight, have probably something to do with the renewal of importations; but one can hardly avoid the reflection that the reduction of the duty on manufactured iron, which Mr. Babcock and his friends are trying to bring about, would mean an immediate shrinkage, to a corresponding extent, in the profits of the United States Steel Corporation.

IT is not impossible that the troubles which incapable sub-contractors inflict upon architects and owners, as well as upon principal contractors, may have had a considerable part in throwing the most important and profitable contracts in city work into the hands of great constructing firms or corporations, which offer to contract for a building of any size, complete and ready for occupancy, staking their reputation and their capital on the sufficiency of every branch of the work. It is currently reported in the building world that some, at least, of these corporations make enormous profits, at the same time that they give reasonable satisfaction to the owners and architects of the buildings which they carry out; and the reason of their success is to be found, in the opinion of most experts, in the control which they exercise over their subordinate contractors, who work, as a rule, only for them, and are, consequently, ready to do what they are called upon to do at the time, and in the manner, required of them. After an owner has had one experience of the waiting for one sub-contractor after another, and the endless attempts to fix the responsibility for carelessness or bad workmanship, which form the usual accompaniment of building-operations, he is ready to turn with open arms to a contractor who does every part of the work with his own men; and it is not surprising that people of great executive ability, with sufficient capital, should have found advantage in the more comprehensive method of carrying on building business.

AN extraordinary piece of dictation by a labor union is reported from Chicago, where the members of the Coal Teamsters' Union have received orders not to deliver coal to any building where fuel-gas is used during any part of the year in any way. Several teamsters, with coal to deliver, are said already to have driven off with their load on seeing signs of the use of gas in the buildings to which they had been sent. Chicago has already been brought near ruin by union methods, and a greater misfortune could hardly befall the city than a public demonstration of this kind that the tyrants are endeavoring to gain control of its industries again; but it is to be hoped that the contest, which will assuredly follow such a preposterous manœuvre, may be short. It is not denied that the scheme for forcing the people of Chicago to give up the use of fuel-gas was concocted by the officials of the Teamsters' Union in consultation with some, at least, of the great coal-dealers. What return the latter have made, or promised, for the amiable assistance of the unions in promoting the sale of their goods is not stated, but it is not impossible that the facts may be brought out before a court. It is fair to say that we do not believe that all, or even the greater part, of the Chicago coal-operators would stoop to such methods of pushing their business; but it is obvious that the same sort of coercion which is supposed to be valuable in compelling the use of coal in place of gas would be equally available for compelling the use of the particular sort of coal furnished by the friends of the unions. The example of the window-glass trust has shown how effectively the workmen's unions can be used for crushing competing manufacturers, and the demoralization produced by the success of monopoly and coercion in business is so great that we need no longer expect to find any scruples shown as to the means by which control is to be obtained.

A STONE arch of nearly three hundred feet span has just been completed, to connect the beautiful old walled city of Luxemburg with its suburbs. The ancient town stands on a plateau bounded on three sides by almost perpendicular cliffs, more than a hundred feet high, and, after these cliffs had been crowned by Vauban with a fortified wall, Luxemburg was regarded as the strongest place in Europe. Its known strength probably preserved it from assault during the stormy times which followed, and, in 1867, it was peacefully made independent, by agreement of the Powers, and, at present, belongs to the young Queen of Holland, who is also, by inheritance, Grand Duchess of Luxemburg. Like all the other Continental cities, Luxemburg has flourished greatly during the last thirty years of peace, and an extensive suburban quarter has grown up outside the walls. As the new quarter is, however, separated from the old town by a deep valley, it has been necessary to establish communication by some means more convenient than a zigzag path down one cliff and up another; and, some years ago, a fine stone viaduct was constructed. This has now become inadequate, and, a second one being found necessary, M. Séjourné, the distinguished Chief Engineer of the Paris, Lyons and Mediterranean Railway, who was employed by the Grand-Ducal Government, conceived the bold idea of spanning the valley by a single stone arch, by far the widest ever built.

LE GÉNIE CIVIL, which gives an interesting account of the construction of the arch, compares it with the other most important works of the kind. The clear span is two hundred and seventy-seven feet, which is nearly sixty feet greater than that of the Cabin John Bridge, in the District of Columbia, until now the widest stone arch in the world. Bold as the construction is, it has been carried out with great economy. The centring, which was designed by M. Séjourné,

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

consisted, substantially, of a lattice arched girder, tied with wire ropes, and stiffened by a latticed pier in the middle. For the purpose of facilitating the construction, a wooden temporary bridge was built directly over the intended arch, supported by seven latticed towers, and a track was laid on the temporary bridge, so that materials could be brought directly over any part of the arch where they might be wanted. This device was particularly advantageous in permitting the masonry to be carried on simultaneously over every part of the centring, so as to prevent the deformation of the latter by unequal loading, and it proved very successful as a means of economizing labor. The arch was built in three concentric half-rings, or "rowlocks," each rowlock being divided into ten sections by temporary wedges, so arranged that, after the centre was lowered, the wedges could be replaced by permanent arch-stones. The object of this was to preserve a certain elasticity in each ring, so that the settlement, which, with every large masonry arch, follows the striking of the centre, instead of opening the joints, or causing fissures in the masonry, should be taken up by the intervals between the sections, and the subsequent filling of these with stone would leave the arch perfect. It may be observed that the disposition of the arch in three rowlocks would also tend to give it elasticity, and enable it to yield slightly to settlement without fracture, but the idea of carrying out such a construction in three rings of comparatively small stones, instead of making it of a single row of voussoirs of such enormous depth that the curve of pressure could not by any possibility find its way out of the middle third, is rather startling. The result, however, seems to have justified M. Séjourné's reasoning, for the striking of the centre was followed by no alarming result whatever. The completed viaduct is to be fifty-two feet wide, but M. Séjourné reflected that a large sum could be saved in the cost of centring, and a certain additional flexibility secured in the whole structure, by building it of two arches, exactly similar, standing side by side, but connected only by a slab of concrete at the top, forming the roadway. The second arch has not yet been built, but the centring, removed from the first one last October, is ready for setting in its new place, where, as soon as the weather will permit, it will be used for the construction of the second arch.

A CURIOUS story, which may be true, is told about the work which the Westinghouse Electric Company has been doing in England, where it has erected immense shops, at a cost, it is said, of seven million dollars. Before the buildings were begun, bids were invited from English contractors, who set, on an average, five years for the shortest time within which they could be completed. The Westinghouse Company did not like the idea of waiting five years for its shops, and concluded to do the work itself, "on American principles." The agents of the Company bought materials and hired workmen, and the consequences of applying "American principles" to the undertaking was that the shops were completed and ready for use in less than one year from the time the work was begun. Among other things, the speed of British bricklaying failed to please the Westinghouse managers, and, although they held a preliminary conference with the official of the bricklayers' union, and agreed to pay ten per cent more than the union wages, they said plainly that they would not be satisfied with the union standard of four hundred and fifty bricks per day, and would require their men to work according to their capacity. With this view, they appointed inspectors, who made regular returns of the amount of work accomplished by each man. The elimination of the slowest and laziest men through this system produced a wonderful effect on the others, and in a very short time the average day's work of the bricklayers was nine hundred bricks per day. Even this, however, did not satisfy "American principles," and, the same sort of encouragement being continued, it was not long before every bricklayer on the job laid at least eighteen hundred bricks a day, while some, on plain work, laid twenty-four hundred. How the apostles of the "living wage," the "dignity of labor," and the rest of the fine things about which we hear so much, could have looked on in silence at such undignified proceedings as these we cannot understand, and it is not likely that such revolutionary performances will be permitted again in union-ridden England; but, in the meanwhile, all the workingmen, contractors and manufacturers in Great Britain have received a new idea, which may ultimately be of more value to them than the frantic howlings about American and German competition with which they have so long entertained the rest of the industrial world.

THIS story about the success of the Westinghouse Company in getting an honest day's work out of union bricklayers in England is confirmed by a letter to the London *Times*, which says that English bricklayers, where they can escape the eye of the spies of the unions, easily lay two thousand bricks a day, and do the work well, while, as soon as the spy makes his appearance, the men, instead of working steadily and faithfully as before, take up a brick, turn it around two or three times, and lay it down, then take up another and repeat the process, and finally, perhaps, decide to lay a third. In this way it is quite easy for them to reduce their efficiency to the union standard of four hundred and fifty bricks per day, and thus avoid the terrible penalties which the union visits on offending members. Where the unions have succeeded in getting political control of work, as is the case with that executed for the London County Council, which not only employs union men exclusively, but pays them by the day, the inefficiency of the men is positively ludicrous. Many a bricklayer, when working for the London County Council, that is, for the taxpayers of the city, lays, on an average, from one hundred and fifty to two hundred and fifty bricks a day. It is not surprising that the public work of the city, which the union members of the County Council had the effrontery to claim would be more cheaply done in the way that they recommended, cost, in some cases, more than twice as much as responsible contractors, even working with union labor, stood ready to do it for. The *Times*' contributor, who is by no means unfriendly to the unions, and still less to their members, thinks that the condition of British industry is beginning to bring the "friends of the toilers" to their senses, and he mentions a case where some members of a bricklayers' union, who had complained to the officials of a foreman who "badgered" them to work more efficiently than the union rules approved, were severely reprimanded, confronted with the foreman, and made to apologize to him, while he was commended for having done his duty in obliging the men to do a fair day's work.

A GOOD citizen and an intelligent King have quietly undertaken a work of great importance in England. Sir Ernest Cassel, who has before shown a most generous public spirit, on leaving England a few weeks ago for India, put in the hands of King Edward the sum of two hundred thousand pounds, to be expended for such charitable purposes as he might choose. It seems that the King has for a long time been interested in the open-air treatment of tuberculosis, now so firmly established on the Continent, and slowly gaining a foothold in England and in this country, and has decided that no better disposition could be made of Sir Ernest Cassel's money than to use it for providing new sanatoria, where the new treatment may be applied in the most efficient manner to at least a small portion of the multitudes of people who would be benefited or cured by it. It may be observed that, although the Germans possess by far the largest number of these open-air sanatoria, and are entitled to the credit, not only of having first arranged them systematically and efficiently, but of having greatly improved them, the French, with their usual skill in planning, have, within the last two or three years, constructed some admirable establishments; while the Swiss, who have for centuries seen consumptives flocking to the dry air of their mountain resorts, are very little behind. In England, although it is only seven or eight years since the publication of Dr. Burdett's work on hospitals, in which he mentioned the accepted theory of the period, that tuberculous patients should be kept in an even temperature, and protected against draughts of air, several good private sanatoria have been built on the new system; and there are, in this country, a few successful establishments. The experience of all of these will furnish something toward the development of the art of curing the most destructive of all diseases, and, if the King's advisers make use of the information now available, as they undoubtedly will, the noble Cassel gift may be of incalculable benefit to humanity.

THE new Superintendent of Buildings in New York has sent a letter to the President of the Borough of Manhattan, suggesting that the so-called "sky signs," many of which are placed on the roofs of buildings, should be absolutely prohibited. They are so prohibited in England, and the danger, as Mr. Stewart says, that they may blow off and injure people in the streets is so great that they should not be suffered. He makes, moreover, the sensible suggestion that the care and inspection of them should be transferred from the Department of Buildings to the Bureau of Incumbrances, where they obviously belong.

NOTES ON IRON AND STEEL CONSTRUCTION.[1]—III.

HAVING observed the properties, or values, possessed by column and beam sections, it is now in order that the application of these values in practical formulas be demonstrated. Before treating this consideration, however, it is necessary to go somewhat more extensively into the calculations for determining the bending-moment of beams.

This term, as it signifies, is simply the expression of the amount of stress exerted at any point in the length of a beam by the loads upon it. The latter part of the term indicates that the force producing bending is not a direct force, but is a moment of a force; that is, the resulting value obtained when a force acts at a particular point through a lever-arm. For instance, at A in Figure 7 the moment of the force a is equal to the value of a multiplied by the length of the lever-arm and is in this case equal to 300 pounds $\times$ 5 feet, or 1,500 foot-pounds, while at B the moment about c is equal to the

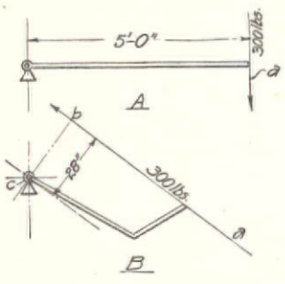


Fig. 7.

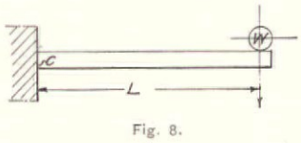


Fig. 8.

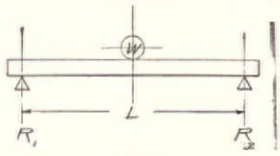


Fig. 9.

value of the force a multiplied, not by the length of the lever-arm, but by the distance $b\,c$, and is, consequently, equal to 300 pounds $\times$ 28 inches, or 8,400 inch-pounds. In this last instance it will be noticed that the distance $b\,c$ is equal to the perpendicular distance from the point c, or the centre-of-moments, to the line of action of the force a. From this it is clear that the moment of any force about any point is equal to the product of the force by the perpendicular distance from the line in which the force acts.

From the two examples just given it will be observed that the bending-moment, or the resultant obtained by multiplying the lever-arm by the force acting at its end, is given neither in units of weight nor length, but in a combination of both, and in whatever unit of length the lever-arm is given, and used as a multiplier, the result must contain this unit in the combined term. So it is that the bending-moment may be expressed either in inch-pounds or foot-pounds, just as the lever-arm is considered. In fact, the bending-moment in plate-girders is often expressed in foot-tons. The values are usually taken in pounds and inches when wooden or steel beams are being considered, and in pounds and feet when a plate-girder is under discussion, the reason for the latter being shown in that portion of the article relating to girders.

By applying these simple principles the usual formula for determining the maximum bending-moment in a cantilever,

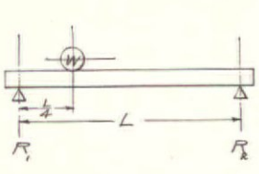


Fig. 10.

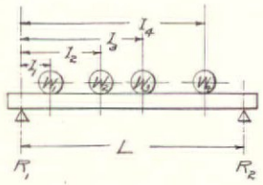


Fig. 11.

that is, a beam supported at one end, is readily evolved. Assume the conditions expressed in Figure 8, and by the principles of moments determine the bending-moment at the point c, at which position it is always maximum in a cantilever. The load equals W, and the lever-arm equals L, consequently, the maximum bending-moment, or M, about c, equals $W\,L$ — or, as it is usually written, $M = W\,L$.

In calculating the bending-moment on any simple beam resting upon two supports, the reactions, or upward thrusts, at the ends must first be determined. The usual method of making the calculations for determining these reactions employs the principle of moments as described. In Figure 9 the beam is supported at both ends, and the reactions, or upward thrusts, at each end of the beam are designated as R_1 and R_2, while the load, which is central, is designated as W. Since the load W is located at the centre of the span, the amount of R_1 and R_2

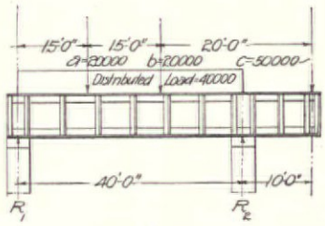


Fig. 12.

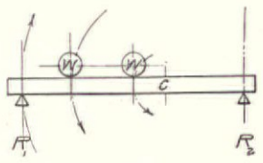


Fig. 13.

is equal in each case to $\frac{1}{2}\,W$, or $\frac{W}{2}$. If the load W had been placed as designated in Figure 10 so that it is one-fourth the length of the span from the left-hand support, or R_1, the farther reaction will amount to one-fourth the entire load on the beam, or $\frac{W}{4}$, while the nearer reaction will be equal to the difference between W and R_2, or three-fourths the load. A fixed law may be evolved from this analysis, which is, that R_2 will always be equal to the sum of the moments of all the loads about R_1, as the centre-of-moments, divided by the span of the beam, or the distance between R_1 and R_2.

In Figure 11 the beam is loaded with the four loads W_1, W_2, W_3 and W_4, which are located at distances from R_1 equal respectively to l_1, l_2, l_3 and l_4; the reaction R_2 may, therefore, be expressed by the following: —

$$R_2 = \frac{W_1 l_1 + W_2 l_2 + W_3 l_3 + W_4 l_4}{L}$$

Besides the foregoing principle, the upward reactions, in order that any beam may be in equilibrium, must equal the downward loads; consequently, if one reaction is determined, the other may be found by subtracting the known reaction from the sum of the loads. This equation may be expressed algebraically as $W = R_1 + R_2$.

When it is required to determine the reaction of a beam loaded with a uniform load, the leverage, or moment of the load, is always considered as the distance from the one reaction, which is the centre-of-moments to the centre-of-gravity of the uniform load. A practical example may tend to make these principles clear, so the following is taken: A plate-girder of the dimensions shown in Figure 12 is loaded as designated, with concentrated and uniform loads, the problem being to determine the reactions, or R_1 and R_2.

Let R_1 equal the centre-of-moments; then the moments of the several loads about this point will equal

Uniform load	$= 40{,}000 \times 20 =$	800,000 foot-pounds.
Load a	$= 20{,}000 \times 15 =$	300,000 foot-pounds.
Load b	$= 20{,}000 \times 30 =$	600,000 foot-pounds.
Load c	$= 50{,}000 \times 50 =$	2,500,000 foot-pounds.
Total	$=$	4,200,000 foot-pounds.

And $4{,}200{,}000 \div 40 = 105{,}000$ pounds, which is the amount of the reaction R_2. Since the sum of the loads, therefore, must equal the sum of the reactions, and as the sum of the loads in this case equals 130,000 pounds, and as R_2 equals 105,000, R_1 must equal 130,000 — 105,000, or 25,000 pounds.

The principles for finding the reactions, just explained, are largely employed in calculating the reactions at the ends of beams and girders employed in a riveted structure, so that the connections may be designed, and in determining the pressure coming upon a pier or abutment from a beam or girder when

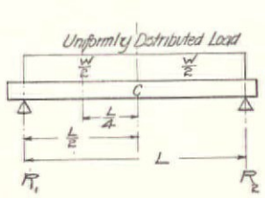


Fig. 14.

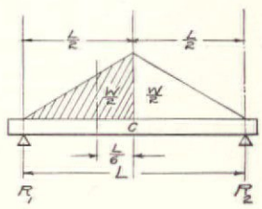


Fig. 15.

the loads are unequal or not symmetrically placed. It is necessary also to determine the reactions before the bending-moment can be figured, as will be explained.

[1] Continued from No. 1360, page 21.

When a beam is subjected to transverse or bending stress the loads act in a downward direction around any point in the beam with a moment equal to their amount by their distance from the point in question, while the reactions act in an upward direction with moment equal to their distance from the

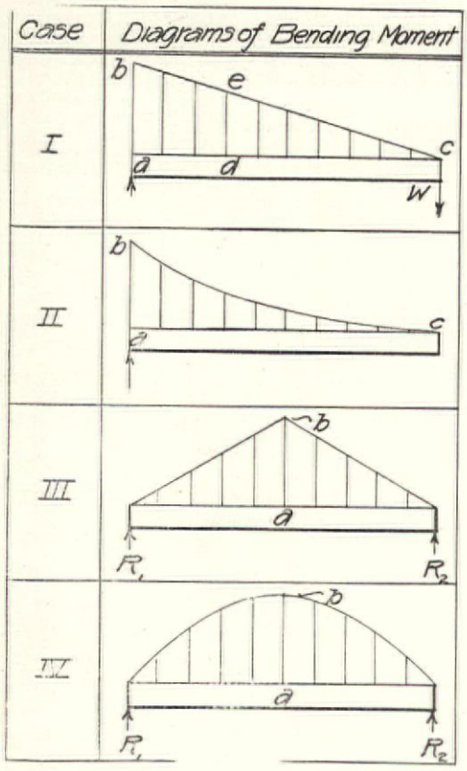


Fig. 16.

same point, or centre-of-moments. Figure 13 makes this clear by the graphical representation of the several loads and reactions acting in opposite directions about the point *c*.

In Figure 9 the load W is shown supported at the centre of the beam with a span equal to L. The reaction R_1 in this figure is equal to $\frac{W}{2}$ and the moment of R_1 about W is equal to $\frac{L}{2}$, consequently, the bending-moment at c is equal to $\frac{W}{2} \times \frac{L}{2}$, or $\frac{WL}{4}$, which is the usual expression for the bending-moment of a beam supported at both ends and sustaining a concentrated load at the centre of the span.

The formula for the bending-moment for the beam loaded with a uniform load as shown in Figure 14 may be likewise determined. For instance, let W equal the uniform load; then R_1, as before, equals $\frac{W}{2}$, and the lever-arm of R_1 about c equals $\frac{L}{2}$; in consequence, the moment of R_1 about c equals $\frac{W}{2} \times \frac{L}{2}$, or $\frac{WL}{4}$; but the half of the uniform load to the left of c opposes the upward moment of the reaction R_1, with a leverage equal to $\frac{L}{2}$ divided by 2, or $\frac{L}{4}$, and the opposing moment equals $\frac{W}{2} \times \frac{L}{4}$, or $\frac{WL}{8}$; then deducting from $\frac{WL}{4}$ the moment of R_1, $\frac{WL}{8}$, the opposing moment of the load, the result becomes $\frac{WL}{8}$, which is the formula for a uniformly loaded beam. The general statement that the bending-moment is equal to the algebraic sum of the moments due to the external forces acting on the beam is true of any beam.

It is not uncommon for a beam to be loaded with a triangular load, and the determination of the formula for finding the maximum bending-moment is quite as simple as those explained in the two previous examples. Figure 15 shows a beam or girder supporting a triangular load, such as would require the support of a beam or girder over an opening in a brick or stone wall. In this case the reaction R_1 equals $\frac{W}{2}$, and the moment of the reaction about the centre c of the beam is equal to $\frac{W}{2} \times \frac{L}{2}$, or $\frac{WL}{4}$. The centre-of-gravity of the triangular load as section lined and which acts with a moment negative, with respect to the moment of R_1 about c, is located at a distance of one-third of the half-span, or $\frac{L}{6}$ from the centre c. The downward moment of the load about the point c — that is, the negative moment with reference to the reaction R_1 — equals then $\frac{W}{2} \times \frac{L}{6}$, or $\frac{WL}{12}$, and the maximum bending-moment which occurs at the centre of the girder equals the algebraic sum of the positive moment of R_1 about the point c and the negative moment of the half load about the same point, which may be expressed as $M = \frac{WL}{4} - \frac{WL}{12}$, or, simplified, $M = \frac{WL}{6}$.

It is seldom necessary to determine the bending-moment at different points in the length of a girder, but where such is the case a graphical solution is probably the most convenient, and at least shows clearly the action of the loads upon simple beams.

Take, for instance, the simplest case of loading, Case I in Figure 16. Here the bending-moment $M = WL$; then the distance $a\,b$ is laid off equal, by any scale, to the bending-moment M in foot- or inch-pounds, as the case may require. From the diagram the bending-moment may be obtained at any point throughout the length of the beam by drawing the line $b\,c$ and scaling the ordinate at the point in question; that is, if the bending-moment is required at the point d, measure the ordinate $d\,e$ with the same scale used in measuring $a\,b$, and the bending-moment at the point in question is readily obtained. In Case II, which shows a cantilever beam loaded with a uniformly distributed load, the bending-moment is represented graphically by the parabola $b\,c$; $a\,b$ as before is laid off equal to the bending-moment, which is obtained algebraically by the principle of moments as previously described, and is equal to $\frac{WL}{2}$. From the length of the several ordinates, the bending-moment at the several points throughout the length of the cantilever may be obtained.

Likewise in Case III, the bending-moment on the beam supported at both ends, and loaded with a concentrated load at the centre, is represented in its action throughout the length of the beam by the triangle which has for its ordinate the distance $a\,b$ made to represent by scale the bending-moment at the centre of the span, and for its base the length of the span.

Where the beam is uniformly loaded, as designated in Case IV, the uniformly distributed load upon the beam supported at both ends is always represented graphically by the parabola which has the distance $a\,b$ for its greatest ordinate, and which equals to scale the maximum bending-moment, or $\frac{WL}{8}$. The fact that a uniformly distributed load on a girder can be represented in this way is valuable in the design of plate-girders, for upon this principle is founded the graphical method of determining the length of the several flange-plates, and, indeed, a similar means of determining the rivet-spacing in the flange-angles may be employed. These several applications of this principle will be given under the subject of plate-girders.

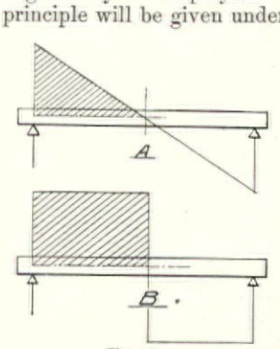


Fig. 17.

As may have been observed, the bending-moment on any beam varies, and attains its maximum value at some point usually determined by trial. The point of greatest bending-moment is always at the point where no shear occurs on the beam.

The loads on a beam act in an opposite direction to the reactions, and the tendency of these opposing forces to shear through the section of a beam is called "shear." The greatest shear on a beam occurs at the abutment at which the greatest reaction takes place. Where a beam is uniformly loaded the shear is greatest at the reactions, and diminishes uniformly to the centre, where it is zero, but where a beam is loaded with a single concentrated load at the centre, the shear is uniform throughout the girder, and is equal to one-half of the concentrated load, or the amount of one of the reactions. These two

conditions prevailing under the different systems of loading are clearly shown in Figure 17 where at A is designated graphically the effect of the shear and its uniform variation from the

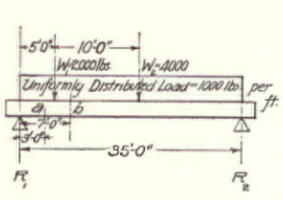


Fig. 18.

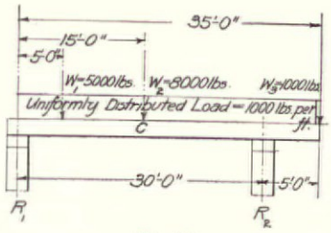


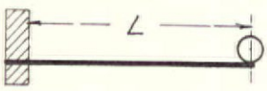
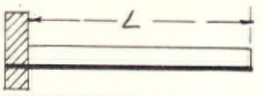
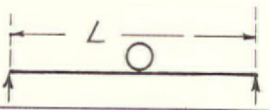
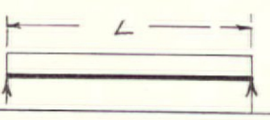
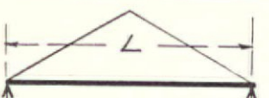
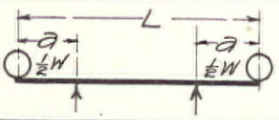
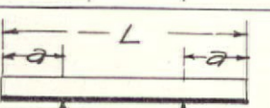
Fig. 19.

abutment to the centre, while at B is designated the uniformity of the shear throughout the beam.

The shear at any point throughout the length of a beam, no matter how loaded, is equal to the algebraic sum of the loads and the reactions. That is, the shear at any point is equal to the reaction at either abutment minus the sum of all the loads supported upon the beam between that reaction and the point in question. With reference to Figure 18, the reaction R_1 equals 21,500 pounds; the shear at point a equals 21,500 pounds minus 3,000 pounds, which is the uniform load to the point in question, or 18,500 pounds; the shear at b on the beam in question is equal to 21,500 pounds minus 7,000 pounds, the portion of the uniform load from the abutment to the point b, plus the concentrated load W_1 of 2,000 pounds, or 12,500 pounds.

If this subtraction of the loads was continued the reaction R_1 would finally be absolved and the shear would equal zero — that is, it changes from a positive to a negative quantity, and the shear is said to change signs. At this point, where the shear equals zero, or where it is said to change signs, exists the greatest bending-moment. When the beam supports a

Table of Formulas for Bending Moments

Method of Loading Lengths in inches Loads in Pounds	Bending Moment Inch-Pounds	Reactions Pounds
	WL	W
	$\frac{WL}{2}$	W
	$\frac{WL}{4}$	$\frac{W}{2}$
	$\frac{WL}{8}$	$\frac{W}{2}$
	$\frac{WL}{6}$	$\frac{W}{2}$
	$\frac{Wa}{2}$	$\frac{W}{2}$
	At either support $\frac{Wa^2}{2L}$ At center of Span $\frac{W}{2}(a-\frac{L}{4})$	$\frac{W}{2}$

number of concentrated loads, or an uniformly distributed and a number of concentrated loads, the shear usually changes signs under one of the concentrated loads. At this point the greatest bending-moment occurs, and the particular load is the first one which, together with the loads lying between it and the abutments, equals or exceeds the amount of the reaction. For example, the beam shown in Figure 19 overhangs one of the supports, and is loaded with a uniformly distributed load and several concentrated loads. The reaction R_1, considering the moments about R_2, is calculated as follows: —

Moment of uniform load	$35 \times 1{,}000 \times 17.5$	$= 612{,}500$
Moment of W_1	$5{,}000 \times 5$	$= 25{,}000$
Moment of W_2	$8{,}000 \times 15$	$= 120{,}000$
Moment of W_3	$1{,}000 \times 35$	$= 35{,}000$
Summation of moments		$= 792{,}500$

and R_2 equals $792{,}500 \div 30$, or 26,416 pounds, and R_1 equals the sum of the loads, or 49,000 minus 26,416, or 22,584 pounds. Taking R_1, then, at this figure, it is evident that the loads up to and including W_1 will not absorb it entirely, but that the load to and including W_2 will be more than sufficient, as they will amount to 15,000, the uniform load plus W_1 and W_2, respectively, of 5,000 and 8,000 pounds, or 28,000 pounds; under the load W_2, therefore, will the greatest bending-moment take place. It is, consequently, necessary to determine the negative and positive moments about the point c directly under the concentrated load W_2. The moment of the reaction R_1, or the positive moment, as it may be called, equals $22{,}584 \times 15$, or 338,760, while the negative moment, as the sum of the moments of the loads between c and R_1, about c or W_2, may be called, is found to equal

$$\begin{aligned} 15{,}000 \times\ 7.5 &= 112{,}500 \\ 5{,}000 \times 10\ &= 50{,}000 \\ \text{or, } &162{,}500 \end{aligned}$$

so that the greatest bending-moment is the difference between the negative moments of the loads about c and the positive moment of R_1 about the same point, or $338{,}760 - 162{,}500$, which gives 176,260 foot-pounds, the greatest bending-moment on the beam, and the desired result.

By these means the bending-moment of any girder may readily be determined, and the shear, likewise, at any point, obtained. Through the table entitled "Table of Formulas for Bending-moments," the transverse stress upon any simple beam may be conveniently calculated. M. M. Sloan.

[To be continued.]

THE DEPARTMENT-STORE RISK.

From a paper in the *Chronicle* by Messrs. De Lemos and Cordes, architects, of New York, we make the following interesting extract: —

"Taken all in all, the department-stores, individually and as regarding fire-insurance risks, may be said to be practically in a class by themselves. The schedules of the New York Fire-insurance Exchange cannot reasonably and to the full extent be applied to such huge structures, and, therefore, contingencies of construction that would cause a given increase or decrease of insurance-rates in ordinary sized buildings do not always cause the same effect in such cases. Clear and concise, though probably not always logical, as the schedules are where buildings of ordinary size are concerned, varying circumstances will modify or even increase the rigor where such exceptional fire-risks are to be encountered. Therefore, the architect has to exercise good judgment and great care in planning his building so as to meet the necessary conditions of occupancy and the very important factor of saving on insurance-rates both to building and merchandise. It will thus be of advantage to combine stairways and elevators at their various locations and to surround them and a hallway in front entirely with iron framework, plaster, and wire plate-glass partitions. The plate-glass will not obstruct the view, and the plaster surfaces of the partitions will be provided near the ceiling, serving as a fire-screen. All can be handsomely developed and ornamented so as to look attractive and cheerful, at the same time giving full security against spread of fire, and having the further great advantage that each stairway is a perfect and safe fire-escape. Facings of marble or metal may be substituted for the plastered surfaces. The doors leading into the hallways should be fireproof and close automatically. Rolling shutters, to be used at night, should be provided in addition.

"It will be found that the rear end of such buildings will have to be given up to receive and ship goods, to house and take care of the employés, to place the large stacks serving the purpose of heating and ventilation; therefore, it will suggest itself, if possible, to separate this portion of the building from the main building by fireproof walls and fireproof doors. The advantage is, that the area of fire-spread is effectually reduced and thereby the fire-risk is substantially lessened. At the same time it is a most perfect fire-escape either way on each floor to the public and employés by permitting the people to descend in safety the stairways in a separated building not affected by smoke or fire. The large freight-elevators, conveyors for merchandise, dumb-waiters, and similar apparatus, which would naturally be

located in this part of the building, should all be inclosed in fireproof walls or partitions, and have solid or kalamined iron doors.

"A great difficulty is always encountered in large establishments in providing proper and convenient access and egress to lunch-rooms and lockers for the great number of employés. The most economical place generally appears to be on the top floor, which, however, in large establishments, is not advisable, embodying, as it does, a great danger in case of fire. Besides, as all employés come and leave at the same time, it is almost impossible to provide for adequate elevator facilities. Supposing there were 4,000 employés and four elevators accommodating forty people each; figuring four minutes for a round-trip, say, of 135 feet travel, it would require twenty-five trips for each elevator, or one hour and forty minutes, to move this number of people either way. Coming and going in the morning and evening and, figuring only one return trip for taking lunch, would be four trips for each person. This represents 100 trips for each elevator or 400 trips for one elevator, equal to a travel of 54,000 feet, or an energy equal to lifting 2,000,000 pounds 135 feet high. In figuring the financial side of this question, aside from the almost insurmountable practical objections, it will be seen that the best results will be obtained by providing the necessary space in an annex or sacrificing the required space on one of the lower floors, which could be reached without the use of elevators, by means of commodious stairs provided for the purpose; at the same time reducing the risk in case of fire to a minimum.

"A necessary provision in all large stores is the arrangement of two waste chutes, which convey all refuse from the various floors to a fireproof inclosed room in the basement or cellar — one for paper, cardboard, etc., to be sold, and the other for refuse to be burned. As all this refuse is highly inflammable, consisting mostly of paper, broken boxes, or similar matter, especial care is needed to prevent the spread of fires through these chutes. Therefore, in every story a receiving-box of boiler-iron, with double iron trap-doors, should be provided, connecting with a main shaft constructed of brick, preferably of boiler-iron, forming the chute. These trap-doors are balanced so as to open and close automatically as soon as the waste has been dropped into the box, and in such manner that, as one door is opened, the other door closes. Arriving at the basement or cellar, the refuse is conveyed thence to the boilers and cremated or otherwise disposed of as stated. The chutes themselves are located within a suitable fireproof inclosed closet with self-closing doors.

"Whether the floors themselves, as they are to be placed on the fireproof-floor arches of concrete or ash-filling, consist of wood or of tile (mosaic) or other material will make little difference as to the fireproof character of the construction. The finished floor is in any case placed on a solid foundation of concrete or other fireproof filling-material, not permitting any air to circulate underneath, and, therefore, making it improbable that a wood floor could be exposed to fire to any dangerous extent. There are several patent compositions offered, such as alignum, asbestolith, lignolith, and others, as substitutes for wooden flooring. For all of these, fire-resistance is claimed. As a matter of course, all woodworks, such as window-casings, base-boards, and door-trimmings, will necessarily be reduced to the least possible limit, or where, for appearance sake, wainscotings or similar decorative finish is to be employed, the same will be of marble, slate, metal, or fireproof wood.

"The location and insulation of the boiler-room, engine-room, of the electric, heating and ventilating machinery, with all their numerous ducts and complicated system of piping, fitting and wiring, are a further subject for careful consideration. That part of the building which is to receive this extensive, complicated, and costly plant must be also completely separated by fireproof walls, and all duct or similar work carrying heated air, electric mains, and steam or hot-water pipes, where passing into the various floors of the building, must be carefully insulated and protected against fire or against spreading or originating fire.

"As to the construction of the façades of the building, the material to be selected is of slight consequence where the building is of the steel-framed type. It is actually not much more than a veneer incasing the metal structure, brick and terra-cotta being, of course, the most fire and weather resisting. Cornices would be preferably of metal (copper, steel, cast-iron, or galvanized iron) instead of stone or terra-cotta, as being light of weight and, therefore, less dangerous than heavy and far-projecting cornices of solid material would be.

"Owing to the uncompromising demands for direct daylight at all floors, the elevations are naturally a combination of piers, metal, and glass. Therefore, a thorough and efficient protection of the fronts against fire does not seem feasible. Such large stores generally face on streets of ample width, and, therefore, the danger of fire eventually to be communicated by buildings fronting them on opposite street-sides is not very great. Devices could undoubtedly be introduced whereby, in such an emergency, the front walls could be flooded or protected by a sheet of water falling over them in a similar manner, as the inside floors of the building receive additional protection through the automatic-sprinkler systems. There seems, however, no case on record where such provision has actually been resorted to, and its effect might be doubtful, owing to the action of heat and water on the large glass surfaces. In almost any case, where damage to buildings from sources herein under consideration occurs, the actual destruction by fire is much less than that caused by water. The contents of all large stores are, as a matter of course, protected against general destruction by automatic sprinklers. As soon as the fire sets them in partial operation great quantities of water are discharged on the floors, penetrate through them, destroying the plastered ceilings, causing wooden floor-boards to warp and damaging merchandise. In addition, the powerful engines of the fire-department, when called in, will send a further deluge into the endangered parts of the building, gutting and ruining all there is contained in that part of it. In many warehouses, therefore, steps are taken to make the floors not only thoroughly waterproof, but to grade them to gutters with inside and outside leader connections. These leaders, of ample section, will rapidly carry off the water to the street sewers and thus prevent great, and sometimes unnecessary losses. The inconvenience of not having even floor-levels renders such arrangements objectionable in department-stores, where the greatest public comfort must be provided, and level surfaces are needed to fit properly the counters and other installations.

"The automatic-sprinkler systems, valuable as they are for checking the spread of fire, and thus insuring a large reduction in the insurance-rates, are, nevertheless, a matter of great discomfort to the architect. Not only is the placing of the enormous tanks, machinery, and piping required to operate the systems for an effective distribution, a complex problem in itself, but the numerous lines of suspended pipes and conductors naturally interfere more or less with any attempt at architectural ceiling-decoration or other effects. Hence, as in many other cases in the architect's profession, utility outweighs the demands of design and art.

"In conclusion, it may be said that the close and continuous study given to an effective fire-protection by architects, by engineers, by the fire-insurance companies, and by the owners themselves, carries with it ever increasing results for the better, as will be readily observed when comparing buildings of recent date with those erected not more than a decade ago. Therefore, it may be reasonably hoped that the appalling losses of property from this source, reduced already by a gratifying percentage through careful building, will yet be lowered very materially, and in the near future." — *The Chronicle.*

A LETTER OF MAJOR L'ENFANT'S.

GAILLARD HUNT, the historian of the Department of State, has raked the files of that Department and prepared a "Calendar of Applications and Recommendations for Office during the Presidency of George Washington." Among the data thus gathered is a letter from L'Enfant to President Washington, which is here reproduced, errors and all, as it throws a most interesting light on a variety of subjects just now engaging public attention:

"NEW YORK *Septbr the* 11*th* 1789.

"SER

"The late determination of Congress to lay the foundation of a city which is to become the Capital of this vast Empire, offer so great an occasion of acquiring reputation, to whoever may be appointed to conduct the execution of the business, that your Excellency will not be surprised that my Ambition and the desire I have of becoming a usefull Citizen should lead me to wish a share in the undertaking.

"No Nation perhaps had ever before the opportunity offered them of deliberately deciding on the spot where their Capital city should be fixed, or of combining every necessary consideration in the choice of situation — and altho' the means now within the power of the country are not such as to pursue the design to any great extent, it will be obvious that the plan should be drawn on such a scale as to leave room for that aggrandizement & embellishment which the increase of the wealth of the nation will permit it to pursue at any period however remote — viewing the matter in this light I am fully sensible of the extent of the undertaking and under the hope of a continuation of the indulgence you have hitherto honored me with I now presume to solicit the favor of being Employed in this Business.

"And now that I am addressing your Excellency I will avail myself of the occasion to call to your attention an object of at least equal importance to the dignity of the Nation, and in which her quiet and prosperity is intimately connected. I mean the protection of the Sea Coast of the United States — this has hitherto been left to the Individual States and has been so totally neglected as to endanger the peace of the Union for it is certain that any insult offered on that side (and there is nothing to prevent it) however immaterial it might be in its local effect, would degrade the nation and do more injury to its political interests than a much greater depradation on her Inland frontiers from these considerations I should argue the necessity of the different Ways and seaports being fortified at the expense of the union in order that one general and uniform system may prevail throughout, that being as necessary as an uniformity in the discipline of the Troupes to whom they are to be Intrusted.

"I flater myself your Excellency will excuse the freedom with which I impart to you my ideas on this subject indeed my Confidence in this Business arises in a great measure from a persuasion that the subject has already engaged your attention, having had the honor to belong to the Corps of Engineer acting under your orders during the late war, and being the only officer of that Corps remaining on the Continent I must confess I have long flattered myself with the hope of a reappointment a hope which was encouraged by several individuals of the former Congress — and now when the establishment of a truly federal Government renders every post under it more desirable, I view the appointment of Engineer to the United States as the one which could possibly be most gratifying to my wishes and

tho' the necessity of such an office to superintend & direct the fortifications necessary in the United States is sufficiently apparent, the advantage to be derived from the appointment will appear more striking when it is considered that the sciences of Military and Civil architecture are so connected as to render an Engineer equally serviceable in time of Peace as in war, by the employment of his abilities in the internal improvement of the Country.

"Not to intrude any longer on your patience and without entering on any particulars relating to my private circumstances of which I believe you are sufficiently informed I shall conclude by assuring you that ever animated as I have been with a desir to merite your good opinion nothing will be wanting to compleat my happiness if the remembrance of my former services connected with a variety of peculiar circumstances during fourteen years residence in this Country can plead with your Excellency in support of the favour I solicite.

"I have the honor to be with profound respect your Excellency

"Most humble and

"obedient servant

"P. C. L'ENFANT.

"THE PRESIDENT OF THE UNITED STATES."

GREAT CANALS OF THE WORLD.

"GREAT Canals of the World" is the title of a study prepared by the Treasury Bureau of Statistics for publication in the forthcoming volume of the *Monthly Summary* of *Commerce and Finance*. It shows the commerce, cost and dimensions of the great canals of the world, especially those connecting great bodies of water, and which may be properly termed ship-canals.

Ship-canals connecting great bodies of water and of sufficient dimensions to accommodate the great modern vessels plying upon such waters are of comparatively recent production and few in number. The one great example of works of this character which has been a sufficient length of time in existence and operation to supply satisfactory data as to cost of maintenance and operation and practical value to the commerce of the world is the Suez Canal, and for this the available statistics begin with the year 1870, while its new and enlarged dimensions only date from the year 1896. For the Sault Ste. Marie Canal, connecting Lake Superior with Lake Huron, statistics date from 1855, though for the canal in its present form they cover only about four years. Statistics of the Welland Canal date from 1867, but for the canal in its present enlarged form cover only two years of operation. The other great ship-canals of the world are of much more recent construction, and data regarding their operation therefore cover a comparatively brief term, and in some cases are scarcely at present available in detail.

The artificial water-ways which may properly be termed ship-canals are nine in number, viz: —

1. The Suez Canal, begun in 1859 and completed in 1869.
2. The Cronstadt and St. Petersburg Canal, begun in 1877 and completed in 1890.
3. The Corinth Canal, begun in 1884 and completed in 1893.[1]
4. The Manchester Ship-canal, completed in 1894.
5. The Kaiser Wilhelm Canal, connecting the Baltic and North seas, completed in 1895.
6. The Elbe and Trave Canal, connecting North Sea and Baltic, opened in 1900.
7. The Welland Canal, connecting Lake Erie with Lake Ontario.
8 and 9. The two canals, United States and Canadian, respectively, connecting Lake Superior with Lake Huron.

The description which is given of each of these great water-ways shows that the total length of the Suez Canal is about 90 miles, the cost $100,000,000, the present depth 31 feet, width at bottom 108 feet and at the surface 420 feet, and that the number of vessels passing through it has grown from 486 in 1870 to 1,494 in 1875, 2,026 in 1880, 3,389 in 1890, and 3,441 in 1900. The tolls charged are about $2 per net registered ton.

The Cronstadt and St. Petersburg Canal, which gives a passage-way for great vessels to St. Petersburg, is 16 miles long, including the deepening of the bay channel, 20½ feet in depth, and the total cost estimated at $10,000,000.

The Corinth Canal, which connects the Gulf of Corinth with the Gulf of Ægina, is 4 miles in length, 26¼ feet in depth, 72 feet wide at the bottom, cost about $5,000,000, and reduces the sailing distance about 175 miles. The average tolls charged are 18 cents a ton and 20 cents a passenger.

The Manchester Ship Canal, which connects Manchester, England, with the Mersey River and Liverpool, was opened in 1894. Its length is 35½ miles, depth 26 feet, width at bottom 120 feet and at the surface 175 feet, and cost $75,000,000. The commerce on the canal shows a growth from 879,204 tons in 1895 to 1,492,320 tons in 1900.

The Kaiser Wilhelm Canal, which connects the Baltic and North seas through Germany is 61 miles in length, 29½ feet in depth, 72 feet wide at the bottom, 190 feet wide at the surface, and cost about $40,000,000. The number of vessels passing through it has increased from 19,960 in 1897 to 29,095 in 1900, of which number 16,776 were sailing-vessels. The tonnage in 1897 was 1,848,458, and in 1900, 4,282,094 tons. An additional canal, connecting the same bodies of water by way of the Elbe and Trave rivers, was opened in 1900. Its length is 41 miles, depth about 10 feet, width 72 feet and cost $6,000,000.

The great North Holland Canal, which connects Amsterdam with the sea, cut in 1845, but deepened at a later date, has now a depth of 20 feet, and a width of 125 feet at the surface. The Caledonian Canal, which connects the Atlantic and North Sea through the north of Scotland, is 17 feet in depth, 50 feet in width at the bottom, 250 miles long, cost $7,000,000, and is at its highest point 94 feet above sea-level. The Canal du Midi, cut through France from Toulouse, on the Garonne, to Cette, on the Mediterranean, a distance of 150 miles, is 6½ feet deep, 60 feet wide and 600 feet above sea-level at its highest point, and has 114 locks; total cost, $3,500,000.

In America the canals connecting the Great Lakes are the principal ship-canals, and are three in number: The Welland Canal, originally constructed in 1833 and enlarged in 1871 and 1900; the Sault Ste. Marie, or St. Mary's River, Canal, opened in 1855 and enlarged in 1897, and the Canadian Canal at St. Mary's River, opened in 1895. The American and Canadian canals at St. Mary's Falls are practically identical in location and dimensions, and are used interchangeably by vessels engaged in commerce, as convenience may dictate. The depth of the canals at the St. Mary's River is sufficient to accommodate vessels drawing 20 feet of water. The American canal was originally constructed by the State of Michigan, but subsequently was taken charge of by the United States and enlarged, at a cost of $2,150,000. The cost of the Welland Canal was about $30,000,000, which was largely due to the circumstance that 25 locks are required in surmounting the rise of 327 feet in the distance of 27 miles. The number of vessels passing through the canals at St. Mary's River has greatly increased during the last few years, while the number passing through the Welland Canal has materially decreased, the number passing through the St. Mary's canals being, in 1873, 2,517, and in 1901, 20,041, of which 15,837 passed through the United States Canal and 4,204 through the Canadian. The number of vessels passing through the Welland Canal has decreased from 6,425 in 1873 to 2,202 in 1899. The marked contrast between the business of the St. Mary's Falls and Welland canals is largely due to the fact that the freights originating in the Lake Superior district are chiefly discharged at Lake Erie ports, and those destined for the Lake Superior region are chiefly produced in the section contiguous to Lake Erie, the Lake Superior freights being chiefly iron, copper and grain, and the Lake Erie freights for Lake Superior, coal and manufactures. The business of the St. Mary's Falls canals by far surpasses in volume that of any other canal of the world, the freight tonnage of the American and Canadian canals combined being, in 1901, 24,626,976 registered tons, while the net tonnage of the Suez Canal in 1900 was 9,378,152 tons, and that of the Kaiser Wilhelm Canal 4,282,094 tons.

[1] The modern work was begun in 1882, while work was first actually undertaken by Periander B. C. 625. — EDS.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES POST-OFFICE, CLINTON, IOWA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

PAVILION-DETAIL OF THE SAME BUILDING.

HOUSE FOR WATER-TOWER NO. 3 AND HOOK-AND-LADDER TRUCK NO. 24, NEW YORK, N. Y. MESSRS. HORGAN & SLATTERY, ARCHITECTS, NEW YORK, N. Y.

THE PARLOR: HOUSE OF C. C. FEBIGER, ESQ., PHILADELPHIA, PA. MR. HORACE SELLERS, ARCHITECT, PHILADELPHIA, PA.

[The following named illustration may be found by reference to our advertising pages.]

DER NEUNERTHOR, SALZBURG, AUSTRIA.

THIS plate is copied from *La Construction Moderne*.

[Additional illustrations in the International Edition.]

HOUSE OF ROBERT S. PEABODY, ESQ., NO. 22 FENWAY, BOSTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

FRATERNITY HOUSE, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA. MR. M. CHESTER KIRK, ARCHITECT, PHILADELPHIA, PA.

THE GARDEN OF C. C. FEBIGER, ESQ., PHILADELPHIA, PA.

WINDOW DETAIL: UNITED STATES POST-OFFICE, CLINTON, IOWA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

NOTES & CLIPPINGS

City Contractor's Liability for Blasting. — The N. Y. Court of Appeals has reversed an order of the Appellate Division which reversed a judgment dismissing the complaint in a suit brought by the company which owns the Holland House, at the southwest corner of Fifth Avenue and Thirtieth Street, against William P. Baird to recover damages for injuries to a vault in the hotel, caused, as alleged, by the negligent blasting of rock in a trench which was being dug in Fifth Avenue by the defendant for the city. The contract between Baird and the municipal authorities called for the blasting of rock, and required it to be done according to the city ordinances. The occurrence complained of happened in August, 1897. The damage to the vault was described on the trial by barbers employed in the hotel, and by a brush-boy. While the trench was being dug they "heard a good many sounds as of blasting." The brush-boy, while not remembering the day, "heard one sound which impressed itself on his mind; it was a big blast." None of the witnesses identified Mr. Baird as the contractor, or as causing the blasts. A civil-engineer testified about explosives, but knew nothing about the quality of the rock in front of the Holland House. The Court of Appeals holds, by Judge Gray, that, under the circumstances, Mr. Baird could only be held liable for injury to adjoining property from the jarring of the ground or concussion of the atmosphere, on proof that his work was negligently performed. "The rule of law," says Judge Gray, "must, therefore, be considered as well settled in this Court that negligence is essential to be proved in such a case as this of consequential injury, in order to create any liability in the defendant. Now, there is nothing in the evidence showing, or tending to show, the fact of a negligent performance by the defendant of what blasting was rendered necessary in the execution of his contract. Indeed, the evidence is so vague upon the subject that it is not certain whence the blast or blasts, of which the witnesses speak, came. If it may be inferred that the defendant was excavating upon the west side of Fifth Avenue, it does not appear where, or how wide, the trench excavation was, or what was its distance from the wall of the vault. The manner of the construction of the vault, whether well or slightly built, is not shown. Nor is there anything to show, considering the circumstances, that the blast was of any extraordinary character, or that its violence was manifested in external ways upon the street. . . . It was a matter of conjecture, purely, whence the blast came which occasioned the damage to the property; what was the nature of the trench, or what the quality of the soil in which the work was being done, or whether the defendant, in conducting the necessary blasting, failed to observe the ordinances of the city upon the subject and neglected to use such care as was incumbent upon him with respect thereto, or to the adjacent property. In short, for aught that appears, the defendant may have taken all those precautions incumbent upon him, in the performance of such a work, and, nevertheless, the damage may have happened to the plaintiff's building as a natural result, influenced, possibly, in addition, by some weakness of construction." The court of last resort was unanimous, but the Appellate Division divided, Presiding Justice Van Brunt and Justices Patterson and Rumsey favoring the maintenance of the action, and Justices O'Brien and Ingraham dissenting. J. Woolsey Shepard argued the case for Mr. Baird, and Aaron C. Thayer represented the Holland House Company. — *Exchange.*

P. Troubetzkoy, the Sculptor. — Paul Troubetzkoy was born at Intra, Lago Maggiore, on the 15th of February, 1866, the second son of Prince Pierre and Princess Ada Troubetzkoy (*née* Winans). The delight of the child was to model; using first soft bread, then later, at the age of seven, being allowed modelling wax to play sculptor. He chose for his first model an old beggar whom he chanced to find outside the villa gates, and whom he paid with fruit saved from his own dessert. From this beginning, always encouraged by his mother, he continued to model from life, his pets and other domestic animals serving as subjects, until, at ten years of age, he was so successful with the head of a horse that his mother, realizing that the child was becoming serious in his work, took the head to Milan for the criticism of the sculptor Grandi. Looking at it carefully, Grandi pronounced it the work of genius, and said that the boy if he worked on was destined to become a famous sculptor. This prediction did not meet with the approval of Prince Troubetzkoy, whose ambition for this son was a military career, the eldest having been already granted permission to study art, as he showed a decided talent for portraiture. Accordingly, at the age of seventeen, the young sculptor was sent to his paternal relatives in Russia, with the hope that under new influences the youth might be made to forget his hobby. But the power of calling was too great. The allurements of a high military career failed to turn him, and after some months' absence he returned to Italy. Finding that he could not follow others, however great they might be, Paul Troubetzkoy began working according to his own particular light; he opened a studio of his own; toiled with all his might, deaf to the criticism of friend or foe; and he so impressed both public and critics that it was finally acknowledged that a new star had arisen, the magnitude of which it was at first difficult to measure. — *From "Paul Troubetzkoy, Sculptor," by William Jarvis, in the February Scribner's.*

Opposition to "Skyscrapers" in Chicago. — On a test vote recently the City Council blocked temporarily the construction of eight skyscrapers. The plans included seven sixteen-story and one fourteen-story buildings. The amount of money which the builders of these structures expect to spend on them is about $12,000,000. The principal opposition against the big buildings came from outlying districts, which have always opposed the erection of high structures in the business district on the plea that they tend to congest all trade in the down-town territory. — *Exchange.*

Babylonian Discoveries of the German Oriental Society. — The members of the Babylonian expedition sent out by the German Oriental Society have, in spite of heat, wind and dust, held out steadfastly at their post, and have brought to light many valuable memorials which, with those already unearthed, will some day give a faithful picture of the ancient metropolis, its streets, temples and palaces, and its social, intellectual and religious life. Up to now four hundred inscribed clay slabs have been found in the centre of the ruins of Babylon. Of only two of them are the inscriptions yet deciphered, but they are pearls of Babylonian literature. One tablet contains a great part of a celebrated Babylonian compendium which explains the Babylonian cuneiform characters. It is a very ancient dictionary, of great linguistic interest and of exceptional value practically. The second tablet contains nothing less than the litany which was chanted by the singers of the Temple of Esagila on the return of the god Marduk to his sanctuary. Marduk, or Merodach, was the son of Ea, and one of the twelve great gods of the Assyro-Babylonian Pantheon. His temple, Esagila, "the exalted house," became the national sanctuary of the whole empire. He also had a sanctuary at Sippar. He is twice mentioned in the Book of Jeremiah, and in Isaiah, as Bel. It was the custom to sing the litany which has now been found after the periodical procession to that grand pantheon which has been brought to light by the expedition, and which, it is hoped, by the winter will be completely excavated. In the meantime Herren Koldewey and Andrae have made another important discovery, a temple of Ador, or Nineb, the tutelar god of physicians, hitherto quite unknown. The German Oriental Society's account of these discoveries, which has just been published, also gives a minute description of an amulet, supposed to protect the wearer from the machinations of the demon Labartu. Labartu was an ashen-hued being, who made people pale with terror, drank human blood, caused great sorrow, and was accompanied by a black dog. This amulet was once hung around a child's neck in order to drive off the demon. — *London News.*

A Porcelain Tower for Paris. — A Sèvres porcelain tower is to be erected on the heights of St. Cloud, the spot where the famous Diogenes lantern was destroyed in 1871. The tower will be 148 feet high and 26 feet in diameter. There will be seven stories and a double winding staircase inside. It will be built, inside and out, entirely of ceramic stoneware and porcelain, and will be decorated externally with blue, turquoise, emerald-green, brown, coral and rose tints on a white porcelain background. The colors will be a perfect polychromatic poem from base to summit, idealizing the fauna and flora and legends of the Forest of St. Cloud. The work is about to be begun at the State manufactory at Sèvres. The tower will be composed of thirty thousand pieces, which will require a hundred bakings. It will be completed in five years. — *N. Y. Tribune.*

The Asphalt Supply. — In a paper read recently before the American Society of Municipal Improvements, J. Howard Bell, C. E., engineering-editor of the *Municipal Journal*, said: "The European companies have not used or approved the artificial mixtures of asphaltum, such as that from Trinidad; the European cities use for street-pavements asphalt-rock only." Further on Mr. Bell suggests that investments in other kinds of asphaltic materials prevent the Trust from developing the promising asphalt-rock, similar to the Swiss and French rock, found in large deposits in Kentucky and elsewhere in the United States, though in time these deposits, in the hands of good managers, will supply one of the best of pavements. "The composition pavement is sometimes cheaper," he says, "but not as durable as good asphalt-rock pavement." — *Exchange.*

Romantic Recovery of a Bust of Queen Victoria. — A sad little romance lately came to light at Windsor, says the *Ladies' Field.* When the Prince Consort died a bust of him was made, and this was taken everywhere by his widow. At the same time Queen Victoria, desiring to perpetuate the personal appearance of husband and wife at the time of their separation, had a bust made of herself. This was lost sight of by those at Court and there was a tradition at Windsor Castle that, by direction of the Queen, it had been hidden away. The King caused inquiries to be made of an old servant who was on the domestic staff at the time of the Prince Consort's death, and he was able to indicate a place where the bust was walled in. The wall was broken, and the bust — an interesting marble presentment of the Queen's appearance in early middle age — restored to sight.

Glass made Soluble. — A resident of Baltimore has, by means of a chemical solution, succeeded in rendering glass soluble and converted it into a liquid form so that it can be applied to articles and surfaces with a brush, like paint. He believes he has discovered one of the lost arts of enamelling, which was possessed by the Egyptians. The formula used will not be patented, as it is a secret one. It can be applied to wood, iron or any woollen or cotton fabric. A large bathtub was exhibited here which the inventor had painted with liquid glass. The tub glistens like a glass crystal and has a surface as smooth and hard as window-glass. — *Exchange.*

The Guide-books and Rome's Good Name. — In view of the fact that Rome now has good water, and that malaria does not occur within five or six kilometres of the city, a deputation of hotel-keepers recently called on the Minister of the Exterior to ask if means could not be taken to persuade travellers and guide-book makers to drop the antiquated talk about Rome being an unhealthy city to live in. — *Exchange.*

Cost of the Rhode-Island State-house. — The inaugural message of the Governor of Rhode Island shows that the total cost of the State Capitol and grounds has been $3,114,402.10, and reports the expectation of the Commissioners that the entire work will be completed before the end of the present year. — *Exchange.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, FEBRUARY 15, 1902 No. 1364

CONTENTS

SUMMARY: —

The Height-limit of Chicago Buildings. — Grates and Mantels are Fixtures. — Collecting Duty on a Sculptured Marble Altar. — Proposed Improvement in New York Street-plan. — Trust Methods applied to Washing. — The faulty Method of Setting Masonry in Paris. — The German Excavations at Baalbek. — Proposed Public Improvements in Paris. . . . 49

LETTER FROM CHICAGO. 51

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES. — V. 52

ROME TO-DAY. 53

EXCAVATIONS IN TURKESTAN. 55

ILLUSTRATIONS: —

United States Post-office, Kansas City, Mo. — Transept Screen: St. Luke's, Germantown, Pa. — Windsor Castle: Two Views. — Warwick Castle. — Ruins of Rivaulx Abbey; — The Nave of Winchester Cathedral.

La Porte Guillaume and the Cathedral, Chartres, France.

Additional: Presbyterian Church, Stockbridge, Mass. — Entrance to Apartment-house, 120-2 West 47th St., New York, N. Y. — London and County Banking Co. Building, Petworth, Eng. — House at Aboyne, on the River Dee, England. — Prize Design for Bridge over the Rhine, Basel, Switzerland. — Rope Bridge over the Kishanganga at Shardi, India. — Design for the Pont de la Monnaie, Paris, France. . . . 55

NOTES AND CLIPPINGS. 56

THE Chicago ordinance limiting the height of buildings in that city to a maximum of one hundred and thirty feet is to be cancelled, leaving owners free to carry fireproof buildings to any height that they like. The old ordinance could be waived, by special vote of the Board of Aldermen, and the applications for such vote were so numerous that the Aldermen, very sensibly, decided that every one should have the same privileges. The streets of Chicago are so wide that there is much less objection to high buildings there than in the lower part of New York; and, as experience has shown that there is a limit of height, varying with circumstances, to which office-buildings can profitably be carried, it is probable that the matter will adjust itself satisfactorily in course of time. Meanwhile, it seems to us that it is very necessary, before hundreds of millions more are invested in steel-frame buildings, to come to some definite conclusion as to the durability of the metal structure in its envelope of masonry. If paint on the steel favors its destruction, as seems now not improbable, it is time to know it; and if steel vertical members, in the lower stories of a building, endure only a few years, as was believed not long ago, it is time to know that also. There would be no difficulty in whitewashing steel structural members, instead of painting them, as was formerly often done in New York, or in using cast-iron verticals in place of steel, as was common a few years ago, but architects, in order to know what methods to specify, need more accurate information than is at present available. Such information could, perhaps, be best obtained by the Building Departments of cities. Naturally, an architect has very few opportunities of inspecting the skeleton of a building after it has been some years in use, and he certainly cannot pull other people's buildings to pieces for the sake of gaining information for himself; but a Building Department often has occasion to investigate old buildings, for various reasons, and can, if necessary, dissect private property for the public good. The examination needed for this purpose would not be difficult or costly, and its results would be of immense importance.

A CURIOUS case, which dealers in grates and mantels should remember, has been decided by the New York Supreme Court. A Mrs. Archibald hired a house of one Powers, with an agreement that if she continued for a certain time to make regular payments, fixed by the agreement, she should receive a deed of the house. During her occupancy of the house, and without the knowledge of Powers, she contracted with Andrews & Newell, dealers in mantels and gas-grates, to put some of their goods in the house, agreeing to pay for them in monthly instalments. She failed to pay these instalments, and also failed to make her payments to Powers, who, in consequence, took possession of the house. Andrews & Newell then claimed their grates and mantels, under the agreement with Mrs. Archibald. Powers resisted the claim, on the ground that they had been attached to the house, and therefore had become a part of his real-estate. Two courts gave judgment in favor of Andrews & Newell; but the Supreme Court reversed the judgment, holding that if Powers had known of the agreement between Andrews & Newell and Mrs. Archibald, and had assented to it, either explicitly or by implication, he could not retain possession of the grates and mantels; but, as they were put into his house without his knowledge, and were so attached to it, with screws and cement, that they could not be removed without injury to the building, he was entitled to hold them as attached to the realty.

THE Custom house officials of the United States are gaining a reputation for nice distinctions which a corporation lawyer might envy. A few days ago, Senator Foraker, of Ohio, was prudent enough to inquire their opinion in regard to a beautiful altar, of sculptured marble, which is being made in Rome for the convent of the Sisters of Charity at Hamilton, Ohio. Under the law, works of art intended for presentation to an "educational or charitable institution" are admitted free of duty, but Senator Foraker evidently understood the uncertainty whether the Board of Appraisers would consider a convent of Sisters of Charity a charitable institution, or whether they would rate a sculptured angel as a work of art or as a "manufacture not otherwise provided for," and made his investigation in time to prevent, if necessary, the shipment of the altar from Italy. Even his experience was, probably, a little disconcerted at the information that the Custom-house authorities thought it likely that the good sisters would make use of the altar, and that the effect of putting a chalice and a candlestick on it would be to constitute it an object of utility, and not an ornament; and that nothing could be considered, for Custom-house purposes, a work of art, unless intended solely for ornament; and that, therefore, the altar could not, under any circumstances, be admitted without payment of duty. It might be suggested that if the nuns would make oath, supported by a bond filed with the collector of the port, that they would not put any candlesticks or sacramental vessels on their altar, but would use it simply to look at, this ought to bring it back into the category of works of art; but Senator Foraker does not appear to have thought of that, and perhaps the appraisers would be unwilling to trust the good sisters to look at their sculptured marble, for fear that they might, inadvertently, or, perhaps, surreptitiously, put something on it which would instantaneously convert it into a menace to American industry.

THE New York Fine-Arts Federation has been encouraged by the comprehensive scheme prepared by the new Commission for the improvement of Washington to urge upon Mayor Low the propriety of appointing a Commission to draw up a similar scheme for New York, under which improvements, as they are made, shall contribute toward a definite scheme, instead of being taken up separately, and at random. When one thinks of what might have been made of New York, if its unrivalled situation had been taken advantage of at the outset in planning its streets, the immense importance of some such definite scheme in municipal improvement is manifest; and, although what is done cannot easily be changed, it is not too late to plan for the future. Both shores of the Harlem River and Spuyten Duyvil Creek still admit of magnificent terracing, which might make them more attractive as sites for the palaces of the future than even the Riverside Drive; and the great, though unavoidable, defect of the Riverside Drive, that it has no particularly interesting beginning or end, could be provided against on the shores of the Harlem, by making the terraced streets connect esplanades at the terminals of the bridges. These esplanades would be very suitable sites for public buildings, and, with reasonable restrictions as to the architecture of structures fronting on them, nothing in New York would offer a greater artistic opportunity. It is for the purpose of pointing out such opportunities, before they are irretrievably lost, that Commissions, such as the Fine-Arts Federation proposes, are useful; and it is much to be hoped that the municipal authorities will accede to the suggestion.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

A REMARKABLE illustration of the way in which great economic ideas, evolved originally by the "kings of finance," or whatever else we may choose to call them, "filter down," as the books say, into the humbler classes of the community, is to be observed just now at the University of the South, somewhere in Tennessee, we believe. At this renowned institution of learning preparations have been made for establishing a laundry, in which the linen of its members may be cleansed. It appears, however, that before the laundry was thought of, the academic linen was washed by the wives and daughters of the mountaineers in the neighborhood, and these hardy citizens, who, as we are told, derive their support from the labor of the female portion of their households, are so far advanced in the knowledge of the new principles of business that they at once proceeded to apply the Standard Oil method to their customers, and notified the authorities of the University that unless the use of the new laundry was immediately discontinued, the University buildings would be burned or torn down over the heads of the inmates, and personal violence would be done to the latter. We are told that two of the most distinguished officers of the University have already "fled," and the application of the new method seems likely to meet with complete success. Now that the ingenious mountaineers have set the example of high finance on a small scale, we may expect to see it widely followed. The occasional lynching of a college professor by his washerwoman, as a penalty for transferring his patronage elsewhere, would have an excellent effect in checking the discontent which people so often feel, not only with their laundresses, but with their butchers and bakers; and as soon as it is generally understood that housekeepers can complain of mouldy beef and last year's eggs only at the risk of their lives, the millennium which the Standard Oil Company, and the coal combination, and the window-glass and tin-plate trusts have so long had all to themselves will begin to "filter down" to the lower strata of the business world.

SOME of the Paris newspapers have been making an outcry about certain cracked stones which appear in the front of the new Opéra Comique. M. Planat, in *La Construction Moderne*, comes to the defence of the architect, and gives, on the authority of an experienced mechanic, an explanation of the trouble. The mechanic, M. Galineau, after observing that the cracks in the stones have existed, in the same condition, for more than a year, says that such fissures, which frequently occur in heavy buildings in Paris, are due to the defective manner of setting stone which is universal in that city. Instead of laying each stone, as is usual in this country, in a bed of mortar prepared to receive it, the Parisian practice is to set the stones on wooden wedges, two to each stone. By driving in the wedges, or drawing them out, the face of the stone is inclined forward or backward, until it is plumb. After several stones have been set in this way, thin cement is poured in at the top of the vertical joints, and makes its way, as best it can, into those and the horizontal joints beneath them, around the wedges. It was formerly usual in Paris to assist in filling the horizontal joints by tucking in additional cement from the front, between the wedges, by means of a long trowel, with serrated edges; but, according to M. Galineau, this process is no longer used. It may be imagined that, on the removal of the wedges, the stones find themselves resting on a very uncertain substratum of cement. Even where the horizontal joints are filled by tucking in mortar from the front, there is no way of compressing it properly, and it forms, in drying, a weak, spongy mass. Where the joint is simply grouted from above, it is a matter of pure chance whether any mortar reaches the horizontal joints, or, if it does, how far it fills them; so that, in this case, the removal of the wedges leaves the blocks supported only at intervals by the irregular course of the grouting under them. Viollet-le-Duc speaks in the strongest terms of reprobation of this method of setting stone, which, as he says, frequently causes the fracture of the blocks through the inequality of the supporting stratum of mortar under them, and M. Galineau makes precisely the same observation.

THE editor of the *Builder* has just made a visit to Baalbek, and gives an extremely interesting description of the work which is being accomplished there by the German Government. Every one knows from photographs the six beautiful Corinthian columns of the Temple of the Sun, which, with their entablature, are all that remain above ground of what was one of the largest temples in the world, and has probably observed, in the same photographs, the enormous stones, some sixty feet in actual length, which form the face of the retaining-wall of the platform on which the temple stands. Since the Germans have taken the ruins in hand, however, a great deal of additional work has been uncovered, and a systematic plan made of the sacred enclosure of Baalbek, and of the buildings surrounding it. From these investigations it appears that the central point of the enclosure was a rock, with a flat top, cut at one side into rude steps. Such rocks are found in various other places in Syria and Palestine, one existing in Jerusalem, and are supposed to have been prehistoric altars, or, at least, altar platforms, while the steps at the side are assumed, without much apparent evidence, to have been made to facilitate the ascent of human victims to the sacrifice. However it may have been with human victims at Baalbek, the flat altar-rock seems to have enjoyed the reputation of great sanctity, for not only was it made, many centuries after the passing away of the prehistoric religion to which it was dedicated, the central point of a group of buildings of a magnificence very disproportionate to the importance of the insignificant town in which it stood, but in later times, when Christianity had become the State religion of the Roman Empire, and the pagan temples were closed by imperial decree, a Christian church was built in the area in front of the Temple of the Sun, in such a position as to bring the ancient altar-rock in the middle of it.

THE discovery of this prehistoric altar is due to the Germans, who, excavating around it, have found, at some distance outside the foundations of the Christian basilica, the remains of a magnificent colonnaded portico, or atrium, some two hundred feet square, entered from a vast hexagonal vestibule, more than a hundred feet in diameter, whose plan suggests a domed covering, which is itself preceded by a portico, or propylea, about one hundred and fifty feet long, with twelve columns, flanked on each side by solid walls. The hexagonal vestibule has an interior colonnade, interrupted by deep niches; and distributed around the great atrium are six exedræ, as if the local philosophers, like those of Athens, discoursed to their disciples in this public place. The altar-stone did not stand in the centre of the atrium, but near the side opposite the entrance, and directly behind it rose the splendid front of the Temple of the Sun. It is evident that the position of the temple was determined by that of the altar-rock, for, in order to place the temple at a suitable distance behind the rock, and with its entrance-door toward the east, which was the rule everywhere with Temples of the Sun, it was necessary to fill the sloping natural surface to a depth, at the western end of the temple, of fifty feet. The huge sixty-foot blocks of stone belong, therefore, to the retaining-wall built to hold the newly-filled earth in place; and, as the German excavations have shown, the same retaining-wall extended around three sides of the temple, enclosing a rectangular terrace, adjoining the atrium at one end, and enough larger than the temple to afford a promenade, some forty feet wide, all around it. The purpose of using the sixty-foot stones, which were indispensable to the construction of a retaining-wall fifty feet high on sloping ground, with such mortar as was known to the Syrians of the Roman period, is thus explained, and the precision with which the Roman engineers estimated pressure and resistance is shown by the fact that their retaining-wall stands firm to this day.

THE city of Paris, whose credit is good, proposes to borrow the sum of sixty million dollars immediately, to carry out certain public improvements "of pressing necessity." Among these improvements is included the erection or completion of three asylums for insane persons, as if insanity were increasing in the city. About fifteen millions are needed for the extension or widening of streets, and a large sum for building new bridges over the Seine, or for widening existing bridges; and it is proposed to complete the Palace of Justice, at a cost of about a million and a half. New sewers will take two millions, and the great highways extending into the country need nearly four millions spent on them within the metropolitan limits. Except a project for a new School of Arts and Manufactures, nothing in the way of interesting architectural work seems to be in contemplation, unless, indeed, the enlargement of the Palace of Justice should include some important new portion.

THE HEIGHT-LIMIT AGAIN UNDER DISCUSSION. — NEW OFFICE-BUILDING UNDERTAKINGS. — THE UNION LEAGUE CLUB-HOUSE. — PROGRESS OF THE POST-OFFICE BUILDING. — OUR LADY OF SORROWS. — THE STADIUM.

THE year of 1902 opens with very great activity in the down-town district. Buildings which, fifteen or twenty years ago, were looked upon as some of the best structures in the city may soon be torn down to make room for larger and higher buildings. Some people are still looking upon the First National Bank Building as one of the best, if not one of the highest, modern office-structures in its vicinity. It seems but a short time ago that we were inspecting its vestibules and halls, and the idea of newness is still associated with it in the minds of many. Now comes the announcement that it may be pulled down to give place to a sixteen-story skyscraper, provided the city ordinance relative to the height of buildings can be modified. This question of the height of buildings here in Chicago is once more being discussed, and at one time recently it looked as if the existing ordinance might become a dead letter. It has been a farce for some time, inasmuch as under the name of "tower" some of the recent buildings have been carried up to almost any height desired. The existing ordinance is useful as providing for the necessity for occasional special permits, always a pleasant matter to the party of the "second part," to borrow a legal expression, and is further supported by those interested in real-estate situated elsewhere than in the very centre of the city. Bringing all the office-buildings within so short a radius of each other, building them so as to hold so many hundreds of people, naturally tends to the greatest congestion of the surrounding streets, and also renders much less valuable even the districts but little removed from the actual centre.

At one time within the last few weeks, it looked as if the recommendations of the Council's Committee on Streets and Alleys would be accepted, granting special permits for building over 132 feet, thus practically annulling the ordinance. On the strength of this there were new schemes springing up on every side for the erection of high office-buildings, and at one time it looked as if the down-town districts might become impassable for the amount of building going on in them. Among others there was a sixteen-story structure to be erected on State Street for Otto Young at a cost of $1,000,000, a fourteen-story annex to the Hartford Building on Madison Street, and still another large building on Monroe and State Streets. Largest of all the building schemes, and one which will doubtless eventually be carried out, is that of erecting an immense office-structure over the half-block bounded by Dearborn, Clark and Monroe Streets, the present site of not only the First National Bank, but the Montauk Building, which only a short time ago was esteemed one of the best and most up-to-date office-buildings in the town, though not carrying so many stories on its foundation as some others. The idea was to tear down the Montauk first and erect that portion for the housing of the tenants disturbed by the demolishing of the rest of the structures. Besides all these plans the managers of the Sherman House are trying to lease their property for ninety-nine years for the purpose of an office-structure. The old Tremont House has seen its last days as a hostelry, and plans have been made to remodel it at a cost of $100,000. The property is owned by the Northwestern University and will be used for college purposes for those departments which are kept in Chicago, rather than at Evanston. In the changing of the building it was first contemplated to include in it an auditorium especially designed for a music-hall. This part of the plan has been abandoned, and it is much to be regretted, as the proposed hall was to have been a model in many respects, Mr. Theodore Thomas having the important matter of acoustics under his supervision as well as some of the minor details which so materially add to the success of such an auditorium.

The scheme for the erection of a new home for the Union League Club is now being actively pushed. The present club-house was built at two different times, the oldest section, however, not being erected more than fifteen years ago. It is one of those Chicago cases of premature old age in a building which in other places would only be considered in the first blush of youth. However, signs of dissolution seem to be upon it, for Chicago is a hard taskmaster when it comes to a question of the buildings which house its thousands. About two years ago a lot of land, 50″ x 100″, just south of the present structure, was purchased, with the thought of eventually adding it to the land now covered by the club-house when the time for a new structure should arrive. It is rumored that the new house will cost in the vicinity of $1,000,000, if an entirely new building is constructed, though some technicality in connection with the land may retard the plan of financiering this somewhat large amount. Several architects have been invited to join in the competition, though it was not opened to all architects who were members of the Club. D. H. Burnham & Company were finally accepted as the architects to do the work, though when it will be done, club-members seem to think, is altogether uncertain. The Club's neighbor over the way, the big white Government Building, is fast putting on the substance of a building. The central walls above the corner one-story structure are now up, with pilasters and carved capitals in place. So, likewise, is the granite about the entrance-ways. The columns with carved capitals, a fine American eagle and several Classic wreaths, are now exposed to the public gaze, and are good pieces of carving. The skeleton dome is rising higher every day, and it will not be long before the exterior stands in its entirety.

A good deal of enthusiasm is evinced here lately in the building of churches. One very large Catholic church, known as Our Lady of Sorrows, has just been dedicated on the West Side. The local papers came out with prints and strong head-lines all attesting to the beauty of this church, "one of the most magnificent in the country. It is built of blue Bedford stone and the style of architecture is *pure Romanesque*. Almost severely plain outside, it is the beauty of the interior that is most impressive." The front façade, which indeed is built of blue Bedford, is of a rather severe Renaissance design, both as to outline and detail, and comes upon one as rather a shock and surprise after having read the description. It most certainly seems a pity that a paper of the standing of this one, in this case the *Record-Herald* (though, as a rule, its architectural descriptions are no worse than those of any other paper) should permit such accounts of recent building to be published. They are, of course, written up by men who know absolutely nothing of their subject, and it certainly seems a mistake that some man, moderately well educated in this branch of art, could not be hired to write such descriptions from time to time as the need for them occurs. If some new stock-yard plant is to be written up, a man knowing something of the business is sent to inspect it, but let some new building be completed, one either deserving high praise or severe censure, and they send out "any old" reporter. He will do to throw together some hackneyed phrases used in art-nomenclature, and the public, having been chiefly fed on such stuff, will never know the difference. But to return to the exterior of Our Lady of Sorrows. As soon as one allows one's eyes to wander from the front to the side façade one sees that brick has become the material used. What is the propriety on a corner lot, where as much, if not more, of the side is seen, of using two different materials is more than the mind of mortal man can perceive, especially in a church, where everything is supposed to stand for truth. Economy is the solving word for such difficult questions, and, no doubt, this would give the correct answer here, but why use stone anywhere, then? Why not brick all around the building? The towers are stone up to a certain point, beyond which, where the eye of man is not supposed to penetrate, they become wood or painted metal. The supporting columns of the entrance are not monolithic, and where they have been cemented are badly discolored and cracked. A very broad band of honeysuckle design finishes the column below the capitals, and gives the somewhat barbaric effect of an armlet, not quite in keeping with the Classic design. The interior of the church has finer points than the exterior, and, if a satisfactory color-scheme is carried out, will present many pleasing features. The ceiling of the nave is one continuous barrel-vault faced with plaster ornamentation very strictly Classic in design. White marble faces the walls for several feet in height, above which everything is plaster. The organ is on each side of the chancel, and when completed may be a feature. The high-altar, the papers tell us, is one of the most beautiful features of the interior, costing $12,000. This may be the ultimate result, but at present only the lower part is marble, while the upper shelves are of wood covered with cambric, and not even an apology for the still higher parts are there, as the monotony of the bare white wall at the back is only broken by a small square window. Owing to the lack of depth of the apse, the vaulting of it is not entirely satisfactory, having the appearance of being unnecessarily compressed. The details are all Classic in character, but are often civic rather than ecclesiastical, as evinced by the fasces over some of the doors. This is unexpected in a Catholic church, where symbolism is apt to be rampant.

Turning from the sacred to the profane, Chicago while building churches is not forgetting her duty as entertainer of the athletes who will be her guests in 1904. The Stadium, where the international Olympic games will be held, is now under discussion, and plans for a huge structure are being talked and thought over. The modern Athenian Stadium had a seating-capacity of between 40,000 and 50,000, and, as Chicago has so much larger country to draw on for an audience, a seating capacity of 75,000 would be none too large to plan for. This seems a goodly number, but when we think that the Colosseum at Rome seated 87,000 and the Circus Maximus over 300,000, an audience of only 75,000 seems quite a little "pinney, pinney poppy show," as we used to say as children. The seats themselves will be covered, and there is some talk of protecting the arena against possible showers by a series of curtains worked by electricity.

PROPOSED NATIONAL ART-GALLERY. — Senator Penrose of Pennsylvania has introduced a bill appropriating $500,000 for a building in Washington to be used as a national art-gallery, "for developing, protecting and perpetuating American art." It is provided that the Secretary of the Interior, the Architect of the Capitol Extension and the Librarian of Congress are to be a committee for the selection of a site for the building, and to have charge of its erection. It is provided that the gallery shall be devoted to works of American artists, and that a commission of "twenty competent connoisseurs" shall be appointed by the President to have charge of the project. — *Exchange.*

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES.[1]—V.

THE FOURTEENTH CENTURY.

THE period of architecture commonly known as the Edwardian period, the Second Pointed, Decorated, or Geometric period of Gothic architecture, extended through the reigns of Edward I, Edward II, Edward III and Richard II—from 1272 to 1399.

By the commencement of the fourteenth century England had made great strides in civilization, the country had become more settled, the laws of the land were consolidated and enforced, and life and property were more secure. In nothing more is this apparent than in the mode of construction adopted in the buildings of the period.

Up to this time secular buildings were marked by simplicity and severity, alike suggesting defence and the aggressive tendencies of the age. The buildings of the Church were, however, removed from the influences and the areas of strife and enjoyed a certain serenity and security, and we find the monasteries, abbeys and churches of this period marked alike by a vigor, delicacy and richness that expressed at once the growth and progress of the arts of peace and of the wealth that enabled their enjoyment.

Beauty and delicacy in art, whether it be in literature, painting, music or architecture, is the living expression of peaceful, prosperous times; thus, we find in the serenity of the Church (the cradle of the arts), that its buildings, paintings and music are among the most magnificent the world has ever produced.

In the early portion of this period flourished the famous institution of chivalry as an outgrowth, or complement, of the Feudal system. This, according to Hallam, consisted in a regular scheme of education, under which the sons of gentlemen, from the age of seven, were brought up in the castle of one of the superior lords, where they were taught the whole discipline of their future profession and imbued with feelings of emulation and a spirit of enthusiasm. From seven to fourteen years of age the boys were styled pages, and at fourteen they were entitled to the distinction of esquire. They were instructed in the manly profession of arms, the art of horsemanship and in exercises of strength and activity. They became accustomed to obedience and courteous demeanor. They attended their masters to the various tournaments and even in battle. Thus, personal valor, emulation, honor, loyalty and courteous magnanimity were inculcated in the formation of the character of the accomplished knight of the period. To this was added the polish of gallantry, deference and devotion to ladies.

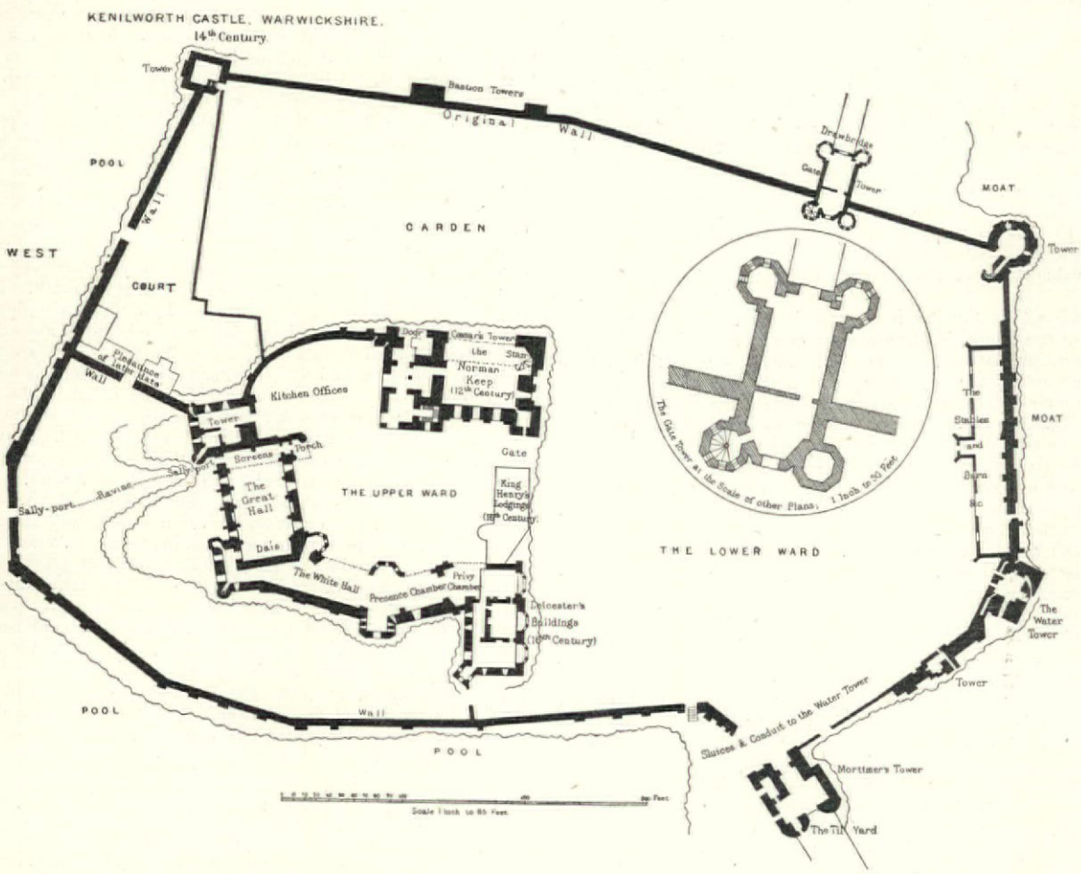
The arts of war, the tournament and the chase formed the chief occupation of the gentlemen of the fourteenth century.

Foreign wars placed England among the foremost nations of Christendom, and the license of plunder and the profits derived from the ransoms paid for the release of captives of high position were sources of attraction to adventurous knights and barons whose numerous trained retinues pressed for active employment.[2]

The spoils of France were found in every castle, and luxury and extravagance increased among all classes.

Great gifts of estate, titles, money and the spoils of the vanquished were bestowed by kings on those who distinguished themselves by their valor and prowess on the battlefield; thus, the career of arms brought not only wealth but founded noble families, established and extended great estates. It is thus, and in these times, that the great family inheritances of England took their rise. But, as there are spendthrifts and improvident men in all ages, many of these estates came at later dates into the hands of the merchant class. The older houses were pulled down, enlarged or beautified, and the former identity of estates, families and their dwellings has disappeared.

It was during this period that Edward III founded the famous Order of the Garter, an order of knighthood consisting of himself, his sons and the most renowned knights of Christendom to the number of forty. The first grand tournament and feast was held on St. George's Day, 1344, in memory of King Arthur, who established the celebrated "Round Table." The King sent his heralds to the courts of France, Burgundy, Hainault, Flanders, Brabant, Germany and Scotland, and the festivities lasted over a fortnight. He also founded and endowed the Chapel of St. George at Windsor, and rebuilt and enlarged the Round Tower and quadrangle, at Windsor Castle.



The language of the country, which, since the Conquest, had been divided, Latin being common among the clergy and learned throughout Christendom, Norman-French the tongue of the nobles and gentry, and English that of the common people, became more consolidated. As an instance of this fusion of tongues we may note that food animals in their live state kept the old English names of ox, sheep, calf, pig, deer, etc., whereas, when dressed, they took the Norman names of beef, mutton, veal, pork, venison, etc. The same influence is found in the established weights and measures. The use of foreign speech was gradually dying out, and English was taught as the standard language in the grammar-schools of the day. The writings of Chaucer in the "*Canterbury Tales*" and Langland in his "*Vision of Piers Plowman*" illustrate alike the language and the manners and customs of the day.

Books, missals, breviaries, psalters and records of all descriptions were at this period written by hand; they were, therefore, comparatively few in number and confined to the monasteries and other centres of learning. The monks were the principal writers of the time, but, as the demand arose, trained writers, or scriveners, appeared, and thus books and records were multiplied.

There was also another class growing up with the increase in

[1] Continued from No. 1361, page 29.

[2] The ransom paid by King John of France in 1360 was three million gold crowns.

commerce; there were merchants amassing princely wealth and consequence. They, too, built themselves dwellings, and their sons were educated to peaceful pursuits, and when we find 12,000 students on the registers of the great school of law at Bologna, similar numbers at Salerno and Paris studying medicine and theology, and many others, we see that the learned professions had made considerable progress at this period of architectural history.

Having, thus, before us the political and social aspect of the country during the Edwardian period, we are better able to understand the people's habits of living, as evidenced in their buildings, and, by noticing the salient features in the architecture of the day, we can picture to ourselves and understand the times during which these buildings were erected.

As wealth accumulated, its possessors naturally sought the comforts, advantages and magnificence that wealth alone could provide. We see this at once in the improvement of their dwellings, their amplification to meet the demands of increased retinues and servants, increased facilities for hospitalities, entertainments and festivities; the separation of the family from their servants; the further retirement and seclusion of the ladies of the household. It is in this direction we find the most marked progress by comparing plans of different dates, as, for instance, Castleton (page 76, vol. LXXII) with Kenilworth. The Saxon thane and early Norman were content with the primitive hall, or common house-place, the one apartment they possessed for cooking, eating, sleeping and dressing indiscriminately, the chamber (or presence-chamber) being first added for the owner's business use during the day, and for the retirement of his family and friends at night. Then came the separate kitchen and its offices amplified around it. During this progressive period we find the first approach made in the refinement and privacy of the family and friends. First, we find its evidence in the Royal lodges where special chambers are set apart for the Queen and her retinue; a little later this is met with in the dwellings of the wealthier nobles, their manor-houses, the granges, and so on downwards.

The hall, or "greet houseplace," became a truly magnificent feature in the dwellings of the wealthy. The merchant-princes emulated the older and noble families in the splendor and extent of their surroundings. The halls of the period were the grandest dwelling-rooms of which we have any record; their magnificent proportions, expansive windows and highly-decorated roofs place them on a par with the monumental works of the Church. Crosby Hall, Eltham Palace and Westminster Hall are familiar examples to every student, and remain almost perfect at the present date.

At one end we find the raised dais, a platform raised two or three steps, on which was placed the high table of state. At the opposite end we find a new feature in a decorative partition of panelled woodwork, usually open, forming a screen to the entrance and to the kitchens and offices. Above this screen was the minstrels' loft, approached by a stairway, usually in the thickness of the wall. The great log fire was still found in the centre of the hall and a louvred turret in the centre of the roof provided the only egress for the smoke. Long tables were ranged at the sides of the hall for retainers and less dignified guests. These were days of wild revelry after the chase, the tournament, or the fray, and after the feast the bulk of the company, both sexes alike, passed the night on the rush-covered floor.

Contiguous to the hall, at the dais end, were the lord's chamber and the lady's chamber, or bower. Gradually, in the manor-houses and the dwellings of the wealthier class, these family chambers amplified in number, forming combined sitting and bed chambers, and the great hall was used more for banquets and great festivities. Private stairs came into use, mostly circular, leading from one floor to another, evolving suites of chambers and also leading to private entrances. The castle-yards became enclosed and were planted with shrubs, forming secluded retreats. Penthurst Place in some measure illustrates this advance.

A chapel, too, is a frequent feature, and a priest's room. The Church kept an ever-watchful eye on the temporal as well as the spiritual welfare of landed proprietors, and the estates of the abbeys and monasteries were frequently increased by bequests and legacies.

The architecture of the period is the Gothic of the previous century, improved, amplified and enriched. The elements of defensive architecture were still demanded by the state of the times, but these essential features were refined in treatment, and decorated, not abandoned, but made less obviously aggressive, or made attractive by their intrinsic beauty and elegance of treatment. Thus, we find the gateway not less massive, but beautified by deeply-recessed mouldings decorated by carvings, the parapets moulded on the embrasures and often panelled on the face.

The keep, or donjon, disappeared entirely; the castle has become the secure and peaceful dwelling, of extent suitable to the rank and affluence of the owner, with its spacious courtyards and expansive lawns, surrounded still with walls of defence, with towers and gateways, within which are sheltered vast barns, granaries and storehouses, with stables and all the necessary out-buildings.

The buttresses, which play such a conspicuous part in the exterior of all mediæval buildings, had during this period more numerous offsets, the weatherings frequently moulded and decorated at the base by panelling and finished at the top by gablets.

The columns of the period were more deeply moulded at the base, and the shafts became clustered, with deep hollows between them. The richly-carved capitals with moulded abaci were very distinctive. The conventional carving of the earlier period had given way to beautiful representations of natural foliage; the leaves and berries of the ivy, maple and oak were the most common, among which birds were frequently introduced. These were deeply undercut in full relief and wonderfully sharp and crisp.

The mouldings, that during the thirteenth century, or Early English period, had become very conspicuously elaborated, now became somewhat simplified; not less beautiful, but more delicate and refined; the dog-tooth decoration, a characteristic of the former period, disappeared entirely, and was replaced by the ball-flower and running sprays of foliage in the hollows.

The work of the sculptor had become more ambitious and as the period progressed we find figures of saints, kings and warriors as isolated works in niches under decorated canopies. They are frequently met with in the more important entrances to churches and monastic buildings and on the walls of castles, manor-houses and granges. The quality of the work is very uniform throughout the buildings of any period.

The windows ceased to be mere loopholes, and gradually widened out and became divided up into numerous lights by moulded mullions, which, as the period advanced, became richly moulded. The heads of the windows, which before had been pierced out of a single slab of stone, were now replaced by geometric figures built up of small stones of the same section as the mullions and known as "bar-tracery," in contradistinction to the plate-tracery of the former period. This treatment of the window-heads as elaborated in the large halls and in ecclesiastical buildings is the most distinctive feature of the period, which, while set out with geometric accuracy, display the utmost grace and beauty in design. There was a marked advance in scientific construction. The walls were better built, the stones were squared and carefully bedded, showing that the forced labor of the unskilled serf, the stability of whose work depended solely upon the ponderous mass of material heaped together, had been replaced by mechanics skilled in the art of construction, who secured better results from the use of less material scientifically disposed.

It is worthy of note, in passing, that the great calamity that swept over Europe about the middle of this period, known as the Plague, or Black Death, had a pronounced influence in the elevation of the laboring-class. This plague is said to have destroyed nearly half the population of England, and, by the consequent scarcity of labor thus created, raised its value and importance, leading up to the ultimate abolition of serfdom and villeinage in England.

In proportion to her population, England is rich in castles, manor-houses and monastic buildings beyond any country in Europe. The Welsh examples of this period form an unrivalled group of themselves, and are infinitely superior in extent and magnificence to any on the Continent of Europe; while such castles as Raglan, Chepstow, Kenilworth, Warwick and Windsor are, for picturesque beauty and elegance of detail, quite unrivalled.

The most celebrated architect of the day was William of Wykeham, who was principal adviser to King Edward III, and who became Chancellor of England. He built the quadrangle east of the keep, and the Round Tower at Windsor; Queensboro' Castle, Kent; established Winchester College and New College, Oxford, later became Bishop of Winchester and rebuilt the nave in its present unrivalled magnificence.

The object of these pages is, if possible, to associate the buildings as we now see them with the times in which they were built, that we may see in them something more than picturesque ruins, and people them with a panorama of the past. The great artist J. W. M. Turner was once painting on the banks of the Thames; a lady approached him and looking over his canvas said, "But do I not see before me the beauties you are painting." He replied, "Don't you wish you could!"

THOMAS C. SORBY.

[To be continued.]

ROME TO-DAY.

FOR the benefit of those who do not have the pleasure of seeing the Boston *Transcript* we make bold to convey bodily from its columns the following account that the Rev. Wolcott Calkins, D. D., gives of the Rome of to-day: —

"Exactly one year after the Kingdom of Italy was constituted by law and proclamation, I entered Rome for the first time. All the way from Milan and Genoa and along the coast to Florence the walls were covered with placards and the people were shouting and getting ready for the anniversary. Possibly this was one reason why I had a bad quarter of an hour in Civita Vecchia. Every article was scrutinized, and at last my Bible was seized, for confiscation if not for the flames. It was only the New Testament, and, fortunately, the Greek text was on every page parallel with the English. I pointed it out to the examiner and assured him that to my certain knowledge the Pope himself cherished an original of that in his Vatican Library as his most valued treasure. With many misgivings he finally permitted me to take the dangerous book into the Sacred City. A dog-cart full of Bibles was the first thing, I believe, that entered the city through the breach at Porta Pia in 1870.

"So I made my exit, March 17, 1862, out of the Kingdom of Italy into the dominion of Pio Nono, escorted from the steamer to train, and received again from train to the city, by French soldiers. In a stay of two months I never lost sight of the blue jacket and red trousers of this contingent of the imperial army. Was this the rude

awakening from Cæsar's dream of Italian unity? Their allies at Magenta and Solferino were now standing with fixed bayonets to stop their approach to the historic capital of the nation. But Bismarck changed all that. In 1866 he admitted the Italians to Venice, and in 1870 to Rome. And now, after nearly forty years from my visit to Papal Rome, and after more than thirty years of its occupation by the kings and by the Parliament of United Italy, I am once more in the Eternal City.

"Italy then meant not much more than a natural paradise, a museum of history, a geographical designation. What is Italy now, and what is it rapidly becoming?

"Rome is not Italy as Paris is France. And yet there is no better way to get started in what I have to tell than to draw a little sketch of what Rome was in 1862, and of what Rome is now. Beyond all question it has lost many of its most lovely and characteristic features. With a pang you search in vain for the magnificent shade-trees of the Villa Ludovisi, and for the Gardens of Sallust. The impressive area of the Colosseum, which you remember as an even ground marked only by the cross in commemoration of the martyrs who suffered there, is half shut off from your approach by vast excavations. You are stopped, as you approach from that side of the Arch of Titus, by a pick-axe brigade, who are tearing up what you used to think was the pavement of the Via Sacra and trying to find another, 10 feet deeper. The smooth level of the Forum, which left only a few exquisite columns and the Arch of Septimius Severus in view, has been succeeded by a vast cavity which needs a lecturer to explain it. As you walk from Saint John Lateran to Santa Croce, you see on your left a long row of uniform and ugly buildings, either vacant or else occupied by Jewish families of average squalor. Then you race across the old city, missing many landmarks and passing thoroughfares that look more like Paris than Rome, and expect to find, at least, the old bridge of St. Angelo intact. No. A new arch on each side has lengthened it out of proportion, and close by it is a horrible bridge of iron. They tell you that they only put it up to serve while the old bridge was impassable, and that they mean to take it down, but you don't half believe that they ever will.

"And where is the glorious view, from the Trastavere, of the grassy banks of the Tiber, and of the old buildings which used to stand thick upon the eastern side, all overgrown with ivy, and all rich in histories of conflict, or intrigue, or adventure? Up and down, the river-banks, as far as you can see, are lined with sloping masonry of uniform stonework; old buildings have been destroyed to make room for the widened river; new bridges, above and below, of French pattern, span the river, and your picturesque old Tiber has become the Seine on a small scale!

"I pity the artists and architects who first encounter these marks of vandalism. But as a man and a brother, I am bound to tell you of some other things, too well remembered, which I see no more. The persistent old beggar, who despite his monstrous deformities used to hobble around the Spanish stairs until you had to give him something, or else step on him, has left no successor. I heard of his retiring from business some years later on an ample fortune. The beggars have nearly all retired from business. I found one cripple on approaching the Vatican, but they tell me that the Vatican is not in the Kingdom of Italy. Of course, the beggars chase you in Naples and all over South Italy, but Rome is almost as free from this pest as Boston.

"There was something immeasurably worse here, in 1862, which has disappeared, or at least has not thrust itself on my observation. In the good order and safety of the streets, Rome is far in advance of Paris and of London. An American lady who has lived here for twenty-five years does not hesitate to go everywhere in the evening without escort, and is never molested. The awful "Roman fever" is also a thing of the past. Recent statistics prove Rome to be the healthiest great city in Europe; the Ghetto, that pestilence-breeding quarter where for centuries, in the ruins of old theatres and porches, the Children of Israel used to drive their plundering trade in old clothes, sham jewels and usury, has been levelled to the ground. An unsightly place with a splashing fountain, quite open to light and air, but destitude of grass and flowers, is left to mark the spot. It is capable of being made a very attractive piazza, of which the adjacent Theatre of Marcellus might be made a grand feature. To the honor of Pio Nono be it said that in 1848, or soon after, the barbarous customs were abolished of locking the Jews in at night and of compelling them to attend a Catholic mass every Sunday and to listen to curses pronounced upon their hated race. But the present Government must have the credit for the final removal of the Ghetto.

"Of course such rapid modern progress as we find in Rome is sure to destroy much that is picturesque, and to substitute more that is commonplace, if not repulsive. The new buildings, public and private, on the Quirinal are wearisome in their sameness of stucco walls. In the entirely new quarter of the city beyond, a worse blunder has been made than on our Back Bay. It was almost a crime to make a rectangular chess-board arrangement of streets in such a city as Boston. Curves and variations in the width of streets ought to have retained in the new the fascinating features of an old city. But we have some relief in the variation in architectural styles. The newest part of Rome has none at all. Sameness and dullness disappoint you everywhere. The effect is even worse across the Tiber, where streets straight as an arrow and too wide for this climate are laid out from the Vatican heights, and lined by uniform barracks.

"But again, as a man and brother, I can see much to admire in all this modern progress. In December, 1870, a few months after Rome had been occupied as the national capital, old Tiber served notice upon its new occupants that they had something else to do than sing pæans of victory. The greatest flood that has been recorded for centuries suddenly inundated the city. The water, which flows normally at a depth of 6½ metres, was swelled by rains in the north, and soon reached a depth of 13½ metres, which always puts the lowest streets under water. This time there was no pause. Higher and higher the floods rose until they reached the unprecedented level of 17¼ metres. The Corso and Ripetta were roaring torrents. The pavement and all the altars of the Pantheon were covered. The whole old city was a lake. The Cloaca Maxima backed up, and drainage was poured back into streets and houses. The millions of damage and the fever-breeding effects of this flood are remembered with a shudder to this day.

"The new Government needed no second warning. The commission summoned Jan. 1, 1871, to take action, made choice of Raffaele Canevari as their engineer. He has made thorough work and has been loyally sustained in his far-reaching plans. The bridge of Saint Angelo at the narrowest place in the river was a dam. To preserve the venerable monument he widened the river, adding the two arches in the old style. To make a smooth, swift current of the enlarged river he lined the banks with masonry. He insisted that all new bridges should make as slight obstructions as possible. Finally, he projected the greatest improvement of all, which has not yet been finished: new main-sewers are to be carried parallel to the river, one on each side, far enough below the city to preclude the refluent current. The mouth of the Cloaca Maxima will soon be closed, and if left at all will only be an unused monument of the republic.

"This colossal work is far from complete. Last winter there was another serious flood, which was much less disastrous and proved that no mistakes have been made in engineering thus far. The new sewers and the elevation of the banks will in time form a perfect protection of the city against this danger, which has been incessant for more than two thousand years.

"There was another immediate necessity confronting the new Government in 1870. It found here a population of 217,000 persons crowded into buildings with only 162,000 habitable rooms. The working people, numbering 57,000, lived in 13,274 rooms, an average of over four persons in a room, and there were slums in which men, women and children, to the number of ten or twelve, spent the night in a single room. The streets were left in a filthy condition, there were nooks and corners, designated by the suggestive name *immondezzai*, where all sorts of garbage might be thrown. The police took little notice of the thriftless Southern habits of the people. There was no board of health worth the name. The malaria of the Campagna shut the city into this narrow compass, which was malarial enough in itself, and Shakespeare's pen could no longer apply to the Rome I saw in 1862 and Cavour saw in 1870: —

"'Now it is Rome, indeed, and room enough.'

"The new Government made an immediate and immense addition to the crowded population. To get room enough was the very first necessity. What wonder that the work was pushed with little regard to landscape or architecture? The vacant heights of the Quirinal were instantly occupied. Former buildings were taken by the right of eminent domain. New structures were hastily erected. The boom resembled what we have seen in Kansas City and other Western cities, and even in Hartford and, still nearer, Boston. New streets were opened and speedily occupied beyond the Quirinal to the Viminal and to the Esquinal. And of course the work was badly done and overdone. New Rome is not artistic, but it is wholesome and roomy.

"There is an amusing confusion in the distribution of public buildings. If you want to 'go to the University' you must be quite sure of what you want and whom you want to see. The University is in the Piazza Sant Eustachio, but when you arrive there with your letter to Professor de Gubernatis, the distinguished author and teacher of Italian literature, you can't get in. You must circumnavigate the building and find the door in the Via Sapienza. You will find Professor Sergi, the anthropologist, in the National Library near the Corso, and Professor Dr. Sante de Sanctis, Professor of Pathology, at his residence, Bocca di Leone, No. 85. When you go to see Michael Angelo's 'Moses' in St. Peter in Vincoli, you will notice on an adjacent hill the ancient monastery of the Canonical Regoliri; it is there that the faculties of the physical sciences and of mathematics have found roomy quarters. The University is everywhere and so is 'the Government.' You think at first that the Quirinal is the new Capitoline Hill. Is not the royal residence there, and next to that the office of the foreign ministry in the former palace of the papal consulata? And farther up the Via Venti Settembre you come to the new building of the War Department, and still farther on to the immense Palace of Finance. But 'the Government' is not all up there. You must go down into the old city to the Palazzo Braschi in the Piazza Navona to find the Ministry of the Interior; across the Corso to the Palazzo Poli, near the Trevi Fountain, to find the Ministry of Agriculture; back again for the temporary quarters of the Ministry of Justice in the Palazzo Firenze; and for the office of the Marine Ministry you turn aside into the old cloister of St Augustine's Church. The rich cluster of cloister buildings between the Via del Seminario and S. Maria sopra Minerva is occupied by the two Ministries of Education and of the Post and Telegraph, and, finally, the General Post-office shares with the Ministry of Public Works the cloister buildings in the Piazza S. Silvestro

in Capite. None of these buildings afford residences for the ministers. They are scattered all over the city, most of them living frugally in some fourth-story apartments. As for the House of Representatives, it has moved often, and is now in a very unsightly building in the Piazza di Monte Citorio. And the Senate in the same building? By no means. You must turn down from the Pantheon towards the river to the Piazza Madama, where a palace of the same name, once the home of Margaret of Parma, and, later, of the Medicis, furnishes a more ornate and more historic place for the Upper House.

"Street changes have been still more extensive and beneficial. We used to start with good courage down from the vicinity of the Piazza di Spagna for the region of the Pantheon; we would soon get bewildered and finally lose ourselves in a labyrinth leading nowhere. Now, the Via Tritone, spacious and on a slight curve, empties the whole of this part of the city into the capacious Piazza Colonna, which opens easily in every direction. The engineers are not satisfied with this. A tunnel is in process of construction which will divert electrics, trams and heavy traffic from this crowded thoroughfare, under the Quirinal and out upon the Via Nazionale. This new boulevard is a splendid avenue from the Piazza di Venezia to the new part of the city, while the grand Corso Vittorio Emanuele opens a wide and entirely new road from near the Capitol through the old city to all the new bridges below the old Ponte Sisto; the heights on the other side of the river have been splendidly improved and crowned with a park, rivalling the old Pincio. Here the equestrian statue of Garibaldi stands, and from this point you have the grandest panorama of the whole city.

"Through these new thoroughfares trolley-cars and trams are running incessantly. For two cents you are swiftly taken from anywhere near the Spanish stairs to the very colonnades to St. Peter's, and for five cents to St. Paul's outside the walls. The system of hacks, strictly regulated by Government, is the best in the world. A clean and roomy carriage with one horse will take you anywhere within the walls for sixteen cents. And if there are four of you it will hardly pay to wait for trolley or omnibus; you will find a cab near-by that will take you by a short cut through the confusing streets to your destination, and the extra four-cent tip, making one lira, will be accepted with thanks.

"There is certainly something twisted in the brain of a writer who grumbles, as Marion Crawford does in his '*Ave Roma*,' about the impiety and the *lèse majesté* of destroying the old city by these improvements. Almost everything that has been destroyed ought to have been destroyed long ago. Light, air, comfort, wealth and immense progress in social and in moral conditions have followed the work of the new Government at every step. There has been sedulous care to guard, or to mark by inscriptions, where removal was unavoidable, historic monuments. The excavations in the Colosseum, Forum and Palatine have made archæological schools, like ours under Professor Norton, and, like the much older and larger German and French schools, a necessity in liberal education. I have not looked in vain for a single book I have needed, in Italian, in French, in German and in English, in the catalogue of the splendid National Library. Rome never had so much to offer the student before."

EXCAVATIONS IN TURKESTAN.

ON an interview with Reuter's representative, Dr. M. A. Stein, who is returning to India after making a preliminary arrangement of the remarkable finds brought to light during his recent expedition in Chinese Turkestan, said that the cursory examination that has so far been possible within the short time available reveals in a striking manner and for the first time many points bearing on the culture and daily life of localities which for many centuries — some for nearly 2,000 years — have been buried under a sea of sand, and whose history has hitherto been practically a blank. Speaking on this point, Dr. Stein said: —

"A full investigation of the sculpture, fresco-painting, objects of industrial art and seals, etc., which were dug out of the temples and dwelling-houses of sand-buried sites will help us to resuscitate the civilization of a region which has played an important part in history as the link between ancient China, India and the Classical West. Now for the first time have been brought to light some aspects of the every-day life, the home industries and arts of the inhabitants of the villages and settlements of Chinese Turkestan which were abandoned in the early centuries after the beginning of the Christian era, and have since been buried under moving sand-dunes. As showing the extent to which the desert has advanced, I may say that some of the settlements excavated are situated fully a hundred miles beyond the edge of the present cultivated area. The great lifeless desert is naturally regarded with much superstition by the people who live in the scanty settlements along the desert edge and the difficulty of carrying sufficient supplies and water has luckily kept the native 'treasure seekers' from visiting and exploiting the more distant and also more ancient ruined sites which have now been systematically explored for the first time under the auspices of the Indian Government. No doubt can be entertained," continued the Doctor, "that the inhabitants of these places were in possession of a culture mainly derived from India, and that they were Buddhists. My excavations go to prove that their culture was highly advanced, and that the art-influences of Greece and Rome were felt even at that great distance from the centres of Classical culture. Khotan is, I should say, about half way between Pekin and Western Europe. Possibly the most striking excavations I made were at a site in the heart of the desert north of Niya, where one settlement was exposed, covering with its scattered dwelling-houses and shrine an area of about six miles by four. Until digging began all that was visible were weird-looking rows of bleached timber pieces projecting in various places like the framework of a wrecked ship from between the sand-dunes. Even with all the interesting work on hand the utter desolation of the place made itself felt most keenly during a prolonged stay, and the uncanny surroundings specially affected my people.

"Of special interest were the refuse-heaps which we unearthed near some ruined houses, once apparently tenanted by village officials — kinds of 'waste-paper' baskets, containing hundreds of documents, beautifully written on wooden tablets, and carefully tied and sealed. Owing to the preservative nature of the sand, many of these were in splendid condition — the ink as black and the seals and string as perfect as if they were only a few weeks old. As these documents are in a known Indian script, their deciphering can be expected to reveal in a fascinating manner many of the details of the ancient village life. But it will be a task requiring years of close study, as in India itself the materials available of this early script have so far been very scanty. At sites less ancient we also found paper documents in Sanskrit, Chinese and also Tibetan manuscripts. In none of the excavations did I find any unknown characters. Round most of the sand-buried houses were brought to light carefully-planned little gardens, with avenues of trees, fenced lanes, orchards, and so forth. It was truly astonishing, on clearing away the sand, to find under the shrivelled hedges heaps of dried leaves, just as they had fallen in ages gone by. The gardens were much the same in character as those still to be found in Turkestan to-day. The trees were mostly poplars and peach, mulberry and apricot trees. There is no evidence that these places were abandoned owing to any sudden catastrophe, but their gradual desertion was evidently due to the impossibility of continued irrigation, causing an advance of the sand.

"While articles of real value were therefore removed by their possessors, we found in the dwelling-places many household implements of small value, such as pitchforks, mouse-traps, boots, chairs, shoemakers' lasts, etc. In the ruined temples we found a sort of unintentional exhibition of the fabrics of these remote ages — for in front of some of the idols were heaps of torn shreds of elaborately-worked silks and other fabrics, which had been deposited as votive offerings. In one temple it was curious to note an instance of where a pilgrim, anxious apparently to propitiate as many deities as possible, had torn into portions a Tibetan manuscript, which he had divided among the various idols. These fragments are now once more united under glass panes. Many colossal statues in stucco were unearthed from the monasteries and temples. One of the latter contained in its cloisters over one hundred statues, all over life size. While as many as possible of these were cleared for the purpose of taking photographs, only a few could be rescued, as when the protecting sand was removed the great stuccos threatened to collapse, owing to their inner wooden work having rotted away. However, interesting portions of them were successfully brought away. As showing how the customs of to-day were in vogue in the past, it may be noted that my laborers at once recognized an ice-pit, which was dug out, by dry leaves, which were apparently used then, as now, to protect the ice from the terrible summer heat."—*London Daily News.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES POST-OFFICE, KANSAS CITY, MO. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

TRANSEPT SCREEN: ST. LUKE'S, GERMANTOWN, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

WINDSOR CASTLE: TWO VIEWS.

THESE and the following plates illustrate the chapter on the "Domestic Architecture of England" elsewhere in this issue.

WARWICK CASTLE.

RUINS OF RIVAULX ABBEY; — THE NAVE OF WINCHESTER CATHEDRAL.

[The following named illustration may be found by reference to our advertising pages.]

LA PORTE GUILLAUME AND THE CATHEDRAL, CHARTRES, FRANCE.

[Additional illustrations in the International Edition.]

PRESBYTERIAN CHURCH, STOCKBRIDGE, MASS. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

ENTRANCE TO APARTMENT-HOUSE, 120-2 WEST 47TH ST., NEW YORK, N. Y. MESSRS. D'OENCH & SIMON, ARCHITECTS, NEW YORK, N. Y.

LONDON AND COUNTY BANKING CO. BUILDING, PETWORTH, ENG. MESSRS. WHEELER & LODGE, ARCHITECTS.

THIS plate is copied from the *Architect*.

HOUSE AT ABOYNE, ON THE RIVER DEE, ENGLAND. MR. JAMES M. PIRIE, ARCHITECT.

THIS plate is copied from *Building News*.

PRIZE DESIGN FOR BRIDGE OVER THE RHINE, BASEL, SWITZERLAND.

THIS illustration is copied from *Schweizerische Bauzeitung*.

ROPE BRIDGE OVER THE KISHANGANGA AT SHARDI, INDIA.

THIS illustration is copied from *Indian Engineering*.

DESIGN FOR THE PONT DE LA MONNAIE, PARIS, FRANCE. M. ED. BÉRARD, ARCHITECT.

THESE illustrations are copied from *l'Architecture*.

NOTES AND CLIPPINGS

STONE AND WOOD PAVING IN EDINBURGH. — Rufus Fleming, United States Consul at Edinburgh, Scotland, in a report to the State Department, says: There is a growing demand in this city for the substitution of wood pavements for granite, especially in the principal streets, where the traffic is heavy and noisy. But the municipal authorities, giving attention solely to the question of economy involved, are not disposed to extend the use of wood. Mr. David C. Proudfoot, City Road surveyor, who has had long experience in the making and repairing of streets, informs me that the life of wood-pavement on a main thoroughfare is ten years, while granite of the best quality will last thirty years if relaid once or twice; and as the cost of wood-paving exceeds that of granite, the reason for the municipal preference for stone in street-making is obvious. The wood blocks formerly used for the few streets having this kind of pavement were infused with a creosote preservative — the common, heavy oil from iron-smelting works. A soft-wood block, 7″ x 9″ and 3 inches thick, would take in about two pounds of the oil under a pressure of 120 pounds per square inch. The present wood-pavements are constructed of Australian "jarrah" hard-wood, requiring no creosote, as it contains a natural oil. Blocks 5″ x 9″ and 3 inches thick are laid on a 6-inch concrete bottom with smooth surface, and joined with cement grout or asphalt. This paving costs about $4.10 per square yard. Nine by 4″ x 7″ granite blocks laid on a 6-inch concrete bed and jointed with gravel cost $3.60 per square yard. — *Exchange*.

THE EXODUS OF PAINTINGS TO AMERICA. — A writer for *The London Daily Telegraph* is so alarmed by the number and quality of the paintings by old masters which have gone to the United States or are about to leave Europe, that he urges the formation of a society like the Société des Amis du Louvre to keep in England the fine pictures still in private hands, notably the Bridgewater Gallery, which contains five Titians, among them the "Three Ages of Man," the "Diana and Actæon," and the "Diana and Callisto." The trusts which have prevented the collection at Bridgewater House from dispersal will soon expiré. It contains Rembrandt's "Hannah and the Infant Samuel" and Raphael's "Virgin with the Palm-Branch" and "Bridgewater Madonna." Can we tolerate for a moment, he asks, even the remote possibility that the great Titians and Raphaels might leave England and find a home on the Continent, or, worse still, on the other side of the Atlantic? "If it came to the worst, ought we to suffer this without some serious effort to prevent what should surely be looked upon as a national disaster?" — *N. Y. Times*.

JERRYBUILT. — In a list of words formed out of proper names a correspondent of *Notes and Queries* gives "jerry-build," to which he assigns the familiar derivation from the Brothers Jerry, a Liverpool firm who in the early part of the nineteenth century put up many showy ill-constructed houses in the northern suburbs of that city. But this etymology has been disputed, and now the *Builder* tries to knock it finally on the head. In this it has the negative support of the "*New English Dictionary*." Dr. Murray says that the origin of the term has not been ascertained. His earliest quotation for it dates only from 1869, and he states that the Liverpool story has been inquired into, but has not been confirmed. A correspondent points out that the term is probably no more than a late manifestation of the old contempt thrown into "Jerry," as an abbreviation of Jeremiah at the time when the Puritans were giving Old Testament names to their children. "Gerrymander" has quite another origin, being taken from the name of Elbridge Gerry, a wire-pulling American politician; but it may be noted that the alleged operations of the Brothers Jerry at Liverpool are assigned to the "early part of the nineteenth century." It was about 1810 that "gerrymander" became current, and it may well be that this new phrase, acting in conjunction with the Jeremiah tradition, suggested "jerrybuilt." From several correspondents we receive evidence of quite another derivation of the "jerry-builder." Among bricklayers, it is said, the walls which were not firm until they were papered were formerly called "Jericho walls," in obvious allusion to the walls which fell down flat when the priests blew with the trumpets. — *London Chronicle*.

THE CHICAGO-RIVER TUNNELS. — Shall Chicago abandon its position as a lake port and become commercially an inland city? This is the question which Secretary Root, in his answer to the request that the Federal Government aid the city in widening and improving the Chicago River, has practically put to the citizens of Chicago. The tunnels now used by the traction-companies are the key to the problem. Until they are removed or lowered vessels drawing over 16 feet of water will be unable to enter this port, which means practically that all important lake navigation will in the future be barred from the Chicago River. In approving the plans of the Drainage Board for widening the river to 200 feet Secretary Root has emphasized the inability of the Federal Government to enter upon any comprehensive plans of river improvement until the tunnels are lowered and the centre-pier bridges removed. The Drainage Board is ready to spend $11,000,000 for the widening of the river and the acquisition of condemned property along the lake-front. The deepening of the river, however, is in the interest of lake commerce, and the city is again assured that not a dollar can be expended for this purpose until the obstructions for which the city is responsible are removed. Even the appropriation of $500,000 included in the River and Harbor Bill for the building of two turning-basins in the Chicago River will not be available until the city has lowered the tunnels. Thus far no definite steps toward compelling the traction-companies to remove or lower the tunnels have been taken, and unless something is done speedily it is reasonable to predict that Chicago's prestige as a lake port will ere long become a matter of history. — *N. Y. Tribune*.

TELEPHONE-POLES FOR EGYPT. — The Telephone Company of Egypt, Limited, operating a large telephone system in Egypt, has experienced great difficulty in securing a suitable pole. The climate of the country is so hot and dry that good timber to use for a pole line for the transmission of an electric current does not grow, and timber imported from other countries dry-rots and becomes useless in a very short time. A certain pole imported from Sweden proved to be the most valuable so far, but its greatest life was not over four years. The Company began negotiations, therefore, with cedar-pole firms in the United States, with the result that arrangements have just been completed with W. C. Sterling & Son, of Monroe, Mich., wholesale producers of cedar poles, ties and posts, for the shipment of 1,500 poles of the white-cedar variety, Michigan-grown, to Alexandria and Cairo, Egypt. Correspondence opened between the two firms last June, but owing to the great distance and slow transportation of mail-matter, arrangements were not completed until last week, and the shipment of the material will begin at once. — *Electrical World and Engineer*.

DUST AND CONSUMPTION. — That dust is a cause of consumption is clearly shown in the statistics of the patients treated at the sixty institutions of the German Empire for the cure of tuberculosis. In 1,095 cases, or more than one-half of the 2,161 persons under consideration, the origin of the disease was alleged to be due to the continuous inhalation of dust involved by their employment, as follows: 431 cases from the effect of "dust" without more exact designation; 182 cases from the effect of metal-dust; 129 cases from the effect of stone, coal or glass dust; 116 cases from the effect of wood-dust; 111 cases from the effect of wool-dust, and 126 cases from the effect of various kinds of dust. These facts suggest to hygienists and inventors the necessity of devising dust-consumers and dust-preventers for factories, workshops, etc. This is a fact that legislators should bear in mind. — *American Medicine*.

NATURE OF LIGHTNING. — In an article recently printed in the *Physikalische Zeitschrift*, K. R. Koch says that he has found that lightning-conductors whose connections have become imperfect through rusting or otherwise act, nevertheless, in an efficient manner in case of a thunder-storm. This is, in his opinion, due to the oscillating character of lightning-discharges. Electro-magnetic waves are produced, which act upon the imperfect connections as upon a coherer, restoring their conductivity for a more or less long period. Lightning has hitherto been considered a continuous discharge, which often becomes apparently oscillatory by quick repetition. The author employs a rapidly revolving camera in order to test this question, but does not arrive at any definite conclusion, as the flashes photographed were all too distant. — *Exchange*.

TENANT'S RIGHT TO REMOVE FIXTURES. — In the submission to the Second Appellate Division of a controversy between Frederick B. Van Vleck, as trustee of Joseph L. Quesenbury, a bankrupt, and Alexander M. White, the question was as to the ownership of a boiler and engine situated on premises owned by the defendant. Quesenbury had been a tenant of Mr. White, having placed the boiler and engine on the premises when he first took possession. Justice Sewell, for the Court, holds that the right of a tenant to remove trade fixtures, placed by him upon the leased premises, must be exercised before the expiration of the term, or before he gives up possession. Assuming, says Justice Sewell, that an unexercised right to remove trade fixtures passes to a trustee of the estate of the tenant appointed in bankruptcy proceedings the day after the issuing of a warrant for the removal of the tenant for non-payment of rent, the trustee loses such right by accepting from the landlord a new lease of the property, "together with the buildings thereon and the appurtenances," not containing any reservation of the right to remove the fixtures. — *N. Y. Times*.

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, FEBRUARY 22, 1902 No. 1365

CONTENTS

SUMMARY: —

The Bill to create a Body of Architects eligible for Municipal Work in New York City. — The "Westminster Chambers" Case again before the Massachusetts Legislature. — M. Santos-Dumont's Progress in Aërial Navigation — A Tale of Land Swindles in Connection with the Chicago Exhibition. . . . 57

THE CROSS IN HISTORY AND ART. 59

A SEWAGE-DISPOSAL SYSTEM FOR A COUNTRY-HOUSE. 61

BOOKS AND PAPERS. 61

ILLUSTRATIONS: —

New Willard Hotel, Washington, D. C. — Scale Details of the Same. — Residence for Mrs. William L. Skinner. — A Sewage-disposal System.

The Belfry and the Cathedral of St. Bavon, Ghent, Holland.

Additional: The Architectural Building: Harvard University, Cambridge, Mass. — Entrance to the Prudential Life Building, Newark, N. J. — A Competitive Design for the United States Post-office, Court-house and Custom-house, Cleveland, O. — Entrance-hall: Architectural Building, Harvard University, Cambridge, Mass. 63

SOCIETIES 63

NOTES AND CLIPPINGS. 63

THE New York Chapter of the American Institute of Architects, with the support of the Fine-Arts Federation, has taken the initiative in a step of great importance to the public, and to the profession, in suggesting the draft of a bill, which has been introduced in the New York Legislature, providing that the Mayor of New York shall, before June 1, 1902, select, from a list of one hundred candidates presented by the Fine-Arts Federation, fifty architects, who shall be listed as "Eligible Architects for Municipal Work," and that architectural work for the city of New York, or for any of its departments, shall thereafter be confided only to architects whose names appear on the list. Provision is made for increasing the number, by yearly selection, until the list contains one hundred names; after this, vacancies are filled, in a similar way, only as they occur. The Fine-Arts Federation is at liberty to propose candidates not resident in New York, and the Mayor may select such candidates. The bill, as introduced, is an excellent one, showing every indication of the utmost fairness of intention on the part of those concerned in drawing it, and it has received deserved commendation and support from a very large number of architects, both members and non-members of the professional societies in New York.

AS to the effect of such a measure, if it should be passed, as seems quite probable, it need hardly be said that the assurance that it gives that public building work will be placed in proper hands is of the greatest value. New York has suffered less, perhaps, than many other cities from the ignorance and incompetence of those whom political influence or favoritism has put in charge of important building operations; but it needs to be secure in this respect, and the course of the authorities in recent years has not been such as to encourage the belief that professional reputation and skill constituted the sole claim to their favor. To put it out of the power of a new administration to reward political services by giving architectural work to incompetent men, or to utilize a dishonest architect as a means of plundering the public treasury for the benefit of politicians, will be a great gain for the city; and this the new bill would do effectually. Few people outside the profession know how great are the opportunities offered to architects for robbing, or helping other people to rob, the owner of a new building, or how strong and persistent is the pressure on the architect of a public building to connive, or, at least, to wink at, overcharges, needless extras, and violations of the contract, in favor of some one influential in politics. Many a young architect, who had fairly won a public commission, has been ignominiously discharged, without explanation, or forced out of his position by deliberate insult and annoyance, to make room for one more ready to join in schemes for diverting the public money into the pockets of politicians; and a law which will exclude from employment on public building work every one not trained in the principles of professional integrity, as well as of professional science, is a most prudent measure.

THE profession, also, has something to gain by a law of the sort proposed, not so much in the way of employment as in the encouragement which it will give to the younger men. In France, the appointment as "architecte du gouvernement" means almost precisely what selection for the eligible list would in New York under the Davis bill; that is, simply, qualification for public professional work. The "architecte du gouvernement" very often passes his whole life without a public commission, but the fact that he has been selected as qualified to carry one out, if occasion should offer, is regarded as a high professional honor. The architect on whom it has been bestowed is careful to make the fact known on all occasions, by adding the title to his name, and it is, naturally, of great advantage in private practice. The man whose name figures on the New York eligible list, particularly if he is young, should find similar advantage in the circumstance; and the chance of winning a place on a list of one hundred is sufficiently good to act as a great encouragement to all architects practising in the city. Some such encouragement is more needed than anything else by the profession in this country. The younger practitioners, who see the award of the most important public commissions secured by bribing servants, or in other equally discreditable ways, become cynical, and, instead of doing their best, fall into the habit of doing what they think most likely to please the unskilled, even if honest, judges who control the decision. For such men a test in which the judges are the most accomplished men in their own profession is a pleasant, as well as wholesome, tonic, and such a test the Davis law provides; for it is very certain that no architect who, in his competition drawings, suspends towers in the air over the middle of large rooms, or who adorns his buildings with Corinthian pilasters without bases, or gives other evidences of imperfect professional attainment, or doubtful professional sincerity, or who has been detected in violations of the code of professional ethics, will ever be presented as a candidate by the Fine-Arts Federation, the ablest and least prejudiced professional tribunal in New York. To receive the suffrages of such a tribunal, or of the similar ones which would be likely in other cities to follow the establishment of one in New York, would do more to encourage a young architect, and strengthen him in his artistic development, than a dozen commissions secured from friends, or from non-expert judges; and the artistic future of this country needs nothing so much as this sort of recognized and skilled criticism.

THE Westminster Chambers matter has come up again in the Massachusetts Legislature in a new form, the city of Boston having petitioned for a change of the law, permitting buildings on the east side of Copley Square, which would include Westminster Chambers, to be "completed, rebuilt or altered" to a height of one hundred feet, instead of ninety feet, as the law stands at present. The object of the petition is evidently to save the city money, for, the Supreme Court having decided that the law establishing the ninety-foot limit was constitutional, the portion of it requiring the city of Boston to pay all damages consequent upon the restriction is sustained with the rest, and the city finds that its bill will be considerably smaller if the Westminster Chambers is permitted to remain as it is, at a height of about ninety-six feet. Now that the Museum of Fine-Arts, which alone, out of all the petitioners for the original restriction, had a tangible reason for its action, is to be removed, there is no one left who will be in the slightest degree injured by letting the Westminster Chambers stay as it is, and the taxpayers of the city, of whom not one in a thousand takes even a sentimental interest in the matter, have a claim to be considered. The newspapers have begun their usual outcry about "defying the law," and so on; but the Legislature which passed the original law has a perfect right to pass a modified one, if it sees fit, and a statute for the relief of the taxpayers of Boston is a very different affair from one intended to make a special exception to a law applying to a considerable number of estates. We have always thought the original law arbitrary and oppressive, and, while that would not justify any one in defying it, a great many people will think that, after the reason for the original law had been removed, a small retrograde movement in the direction of equal rights for all citizens might not be amiss, independent of any

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

consideration for the taxpayers' pockets. One of the Boston newspapers makes a rather unfortunate comparison of the Westminster Chambers with the Algonquin Club, the front wall of which originally projected beyond the street line, and was, by order of a court, taken down and rebuilt. In the case of the Algonquin Club, however, the restrictions were clearly fixed in the deed of the land, and it was the neighboring owners who objected, with good reason, to the construction of the club-house on territory in which they had rights. This was quite a different matter, and it was as much for the interest of all the citizens to see that no owner was allowed to encroach on the property of his neighbors or of the public as it is now to see that no one is selected for special oppression without good reason, and that, if the reasons which make oppression necessary are removed, the oppression shall, so far as possible, cease.

NOTWITHSTANDING M. Santos-Dumont's occasional misfortunes, his attempts at navigating the air form the most interesting and important events of the day, for, in his fragile craft, the daring inventor carries the fate of empires. Starting from Nice the other day, while waiting for a favorable wind for a trip to Corsica, he sailed over the water to Cape Martin, and then turned and came back, performing "graceful evolutions" with his balloon. Cape Martin is only about two miles from the Italian frontier at Vintimiglia. If, then, France and Italy had been at war, as they have been on the point of being several times within the last five or six years, it would have been easy for him to sail for a few moments farther eastward, and, instead of amusing the ladies on the beach at Mentone, to perform his "graceful evolutions" over the Italian fortifications at Vintimiglia, leaving them, with the aid of a few packages of explosive gelatine, a mass of ruins, and the way clear for the march of an invading army. Moreover, Cape Martin is in plain sight of the great city of Genoa, and the naval station of Spezia, and a few more "graceful evolutions" would be quite sufficient to destroy the docks of Spezia, and the vessels under construction there, and to render the fortifications of Genoa useless.

ALL these things are obviously already within the power of Santos-Dumont and his balloon, and it cannot be doubted that, before many months have passed, machines will be built capable of taking much longer and swifter flights, and carrying greater burdens, than are suited to his modest craft. When this result has once been attained, the political equilibrium of the world must inevitably begin to rearrange itself. It need hardly be observed that the system of civilization by extermination will be the first to fall before the new force. When science has put it within the power of an oppressed or defeated people, however weak in numbers, to build or buy, at a hundredth part of the cost of a battle-ship, a machine which will travel over sea or land, more swiftly than any steamer or railroad train; which can, in an instant, destroy the most powerful naval vessels, either at sea or in port, blow up railway bridges and viaducts, and the ammunition and commissary trains of armies on the march, and, flying over the heads of the armies, can burn and destroy the enemy's cities, the coercion of weak nations by the strong ones must cease. The stronger the oppressor, the greater and richer will be the cities which lie at the mercy of the avenger, and the advantage, in such a contest, will be on the side of the poor community, which has no cities, ships or armies to lose, but possesses the means of destroying those of its enemies. It is not necessary that a Santos-Dumont should be found to sail in every air-ship. When once the secret of directing the flight of a balloon is known, its capacity as an engine of destruction can be utilized without the employment of a pilot. Supposing, for example, the people of the Low Countries to wish to make a "demonstration" in behalf of their brethren in South Africa, it would be by no means difficult, even in the present state of knowledge, to send a swarm of balloons, driven by compressed-air motors, or something of the kind, over the hundred miles or so separating the Belgian coast from London; and, with fuses timed with even moderate precision, fire and destruction could be scattered through the metropolitan district. It is true that such an attempt would be immediately followed by the appearance of a British fleet off the Belgian coast, but, with a few "graceful evolutions" of a Santos-Dumont, the English vessels could be sent to the bottom before they reached their destination. We have no wish to suggest, still less to encourage, the application of science to violence, but prudence in anticipating events is the best means of avoiding or mitigating them, and the peace of nations, and the security of their citizens, will be promoted by the clearest possible understanding of the offensive resources which the near future will afford, and which will render navies useless, make foreign expeditions impracticable, and transfer the devastation of war to the centres of population.

IN a more peaceful field, the advent of the navigable balloon will have important and extended consequences. Supposing M. Santos-Dumont, instead of a person of scrupulous integrity, to be intent upon dishonest gains, it is difficult to see how he could have been prevented, after flying from Nice to Mentone, from flying a few miles farther, and landing, at some point across the Italian frontier, such portable articles as he might wish to introduce into Italy without paying duty on them; or, to suppose a case nearer home, if a rival aëronaut were to start at night from some point in Northern Mexico, and land a hundred thousand dollars' worth of jewelry somewhere in Texas, where an agent of New York or Chicago jewellers was waiting to receive it, no possible vigilance of Custom-house officials could prevent him. The duty on jewelry brought into the United States is sixty per cent, so that the profit on each trip would be sixty thousand dollars, and it would be easy to make a trip every night. As in the other case, we are very far from advising any one to imperil his soul in such adventures, but it can do no harm to point out that, if persons deaf to the voice of wisdom should indulge in them, the consequence would be the speedy bankruptcy of all, or nearly all, the jewellers in the United States not concerned in the conspiracy, for the obvious reason that the contraband dealers, having a sixty-per-cent advantage over their competitors, would soon have all the trade. The same system would, undoubtedly, be utilized for the importation of other goods, having great value in a small compass, and burdened with heavy duties, and it would not be surprising to see some of the most highly protected industries brought, by the introduction of the navigable balloon, to the position of earnest advocates of a change in the tariff, as the only means of saving them from ruin.

SOME one, who has been inspecting the list of delinquent taxes about Chicago, finds in it evidence of the collapse of the great speculation of 1893 in lots in the "extension of Jackson Park, Chicago," as it was called. It will be remembered that Jackson Park borders on Lake Michigan, and about three million dollars were paid to the promoters of the scheme in return for deeds of lots from six inches to three feet under water. These worthless lots sold, in some instances, for three thousand dollars each. Now, the owners do not care to pay the very trifling tax upon them, to keep them from being sold by the sheriff. The moral of this tale is that people who propose to buy land as a speculation will do well to see the land before they commit themselves; and, in the case of Chicago speculations, even this is not always sufficient. Years ago, when Chicago was growing rapidly, the real-estate operators were said to have a way of buying up a large tract, laying out and grading streets, setting lamp-posts and so on, and then advertising a grand excursion and auction sale for a certain day. On the appointed day, the excursionists found the place swarming with workmen, new houses going up on every side, bricks, mortar and lumber encumbering the streets, and the air full of the cheerful sounds of trowel and hammer. The auction then began, amid great enthusiasm; large sums were bid for choice of lots, and multitudes of the visitors went home feeling that they had secured a fortune by a successful bid. Before the last excursion train was out of sight, the sound of hammer and trowel had ceased; the workmen were packing up their tools, carts were removing the bricks and lumber, and, by nightfall, the place had reverted to solitude.

OF necessity the exigencies of rapid serial publication compel editors to depend on certain routine systems which are supposed to be automatic in their working; but now and then these routine operations break down, as any system in which the personal equation enters is liable to do. Some of our readers possibly detected that the illustration of the Post-office at Kansas City, Kans., published in our last issue had already made its appearance in our issue for November 10, 1900. The accidental replacing of a used negative among those not used is probably responsible for the republication. Fortunately, Mr. Taylor's designs are so satisfactory, a second appearance of one of them can hardly be considered a grave misfortune.

THE CROSS IN HISTORY AND ART.[1]

THE simple Latin cross, free from floriation or ornament, is known as the cross of suffering or passion. It represents the actual gibbet-altar upon which the atonement was offered. The barbarous execution by crucifixion, of which traces are to be found from a very remote period, was carried into effect in two forms — viz, when the sufferer was left to perish bound to a tree or an upright stake, sometimes after being impaled; and when by nails driven through his hands and feet, his limbs also sometimes further secured by cords, the sufferer was fixed with outstretched arms to a cross having a horizontal bar as well as a vertical stake.

The form of this instrument of punishment inspired a deep and unmitigated horror on the part of the Romans. Cicero, who lived before the Christian era, says that "the very name of the cross was banished from the thoughts, eyes, and ears of a Roman citizen," and several generations elapsed ere the old ideas connected with the "arbor infelix" gave way before its new meaning, so that it was not till the middle of the fifth century, more than a hundred years after the cessation of death by crucifixion, that the pure form of the cross emerged to sight. . . .

THE PUNISHMENT OF THE CROSS.

This form of punishment was in ancient times a very ordinary one, and of far wider extent than is generally known. It was common among the Scythians, the Greeks, the Carthaginians, the Germans, and the Romans, who, however, principally applied it to their slaves, and rarely crucified free men unless they were robbers or assassins.

Alexander the Great, after taking the city of Tyre, caused 2,000 inhabitants to be crucified. Flavius Josephus relates, in his "*Antiquities of the Jews*," that Alexander, the King of the Jews, on the capture of the town of Betoma, ordered 800 of the inhabitants to suffer the death of the cross, and their wives and children to be massacred before their eyes whilst they were still alive. Augustus, after the Sicilian War, crucified 6,000 slaves who had not been claimed by their masters. Tiberius crucified the priests of Isis, and destroyed their temple. Titus, during the siege of Jerusalem, crucified all those unfortunates who, to the number of five or six hundred daily, fled from the city to escape the famine, and so numerous were these executions that crosses were wanting, and the land all about seemed like a hideous forest. . . .

THE CROSS IN ART.

Crosses exhibiting an endless variety of form, proportion, and adornment surmounted the loftiest architectural features of cathedrals and churches, while here and there upon the masonry they attested the consecration to Christian worship of the buildings which bore them. With the triumph of Christianity, the cross was recognized as a symbol of the highest dignity and honor. It was made of the most precious materials, enriched with the most costly gems, and adorned with most exquisite art. The cross became the proudest ensign upon royal diadems, and it gave both their form and their name to the noblest insignia of knightly rank. The cross crowned the sceptres of princes, and warriors of renown were proud to see the cross as well in the hilts of the swords as in the banners under which they fought. In private life also the cross was held in corresponding estimation, and, accordingly, the most beautiful and most highly-prized personal ornaments appeared in some cruciform type. In this connection it may also be mentioned that Justin Martyr said, "The sign of the cross is impressed upon the whole of human nature. There is hardly a handicraftsman also but uses the figure of it among the implements of his industry."

The mediæval artists delighted in designing the cross under various conditions of both form and decoration. They wrought leaves and flowers into cruciform figures, and adorned their crosses with foliage in every degree of richness. They made the cross both simple and compound; they introduced it in combination with other figures and devices; and they composed it from figures and devices, each one of them having some definite motive or significance of its own. . . .

CROSSED AND CRUCIFORM STANDARD MEMORIALS.

Among the remains of early monumental art preserved in Scotland, none, it is believed, can be accounted more interesting and worthy of thoughtful inspection than those curiously pictured pillars described by Gordon, Cordiner, and other topographers of the eighteenth century. Of their age and purpose nothing seems to be known more precisely than that they were probably set up at a remote time, either as wayside incentives of devotion — to commemorate a military leader slain in battle — the battle itself — or, as some are disposed to think, to mark the boundaries of jurisdictions and feudal territories.

In local parlance they are called Danish stones, in accordance with tradition, which has always connected them with the battles fought with the Northmen in the early part of the eleventh century. But, however much they may be historically associated with Danish transactions, it does not follow that the Danes themselves had anything to do with their erection, for it is not to be supposed that they would be at the trouble and expense of erecting such artificial monuments of their rapine. Besides, these stones have generally crosses, while the Danes at that period were not Christians. It is, therefore, concluded that these remains belong to the Picts, the inhabitants of the country. In another passage regarding these pillars Pinkerton believes that some of them belong to the period between 843 and 1056; and again, with reference to the sculpturings upon them, thinks "it may be also reasonable to infer that the centaurs, elephants, and some other representations on these singular monuments, may have passed from the Roman mason left in Britain, after the departure of the military force, to their native apprentices, and thus having descended with the craft, as traditional decorations without meaning, as the skulls of bulls used in ancient sacrifices continue to mark certain parts of modern architecture."

These pillars, which are confined almost altogether to the northern and north-eastern counties, consist of a parallelogrammic pillar of one stone, varying from about 5 feet to 22 feet in height, from 18 inches to nearly 6 feet in width, and from 3 inches to 16 inches in thickness. In most instances a Latin cross, with short arms hollowed out at the angles of intersection into half, three-quarter, or entire circles, trefoils, or rectangular notches, occupies, more or less in relief, one, not unfrequently both, the superior faces of the pillars. Often the arms of the cross are free; as frequently, perhaps, they are surrounded by a circular fillet, or wheel, or by a cincture of slightly elliptical shape. In all instances the cross, which generally occupies the whole plane of the pillar, is ornamented variously with bosses, pellets, figures of men and animals, etc.

While on the subject of carved and cruciform pillars, a few straggling specimens of miscellaneous character may be mentioned, which, although in main part comparatively modern, may in some instances be coeval with the oldest of the kinds above referred to. Of these, the nearest to the Norman type are a curious cruciform specimen in the islet of Inishail, Loch Awe; one of slab form, with cross, etc., beautifully situated over a well at Kilmory-Oab, in Knapdale; and another, overspread with the cross, braided work, etc., at Corsewall, on Loch Ryan, Galloway.

In the village of Dull, Perthshire, and in its immediate vicinity, are several plain, ponderous cruciform pillars, evidently the production of a rude time; and of the same sort are some heavy specimens standing on the low, grassy Eilean Finan, in Loch Sheil, in the highland districts of Moydart and Sunart. The pillar at Eccles, Berwickshire, incised with some coarsely-executed figures, and ending in a solid disc quartered on both faces by a plain cross; and the Merkland Cross, near Kilpatrick-Fleming, Dumfriesshire, nearly 10 feet in height, are quite distinct types, and the latter of no great antiquity.

The well-known Ruthwell pillar, which by some is supposed to be of early Saxon date, is about 18 feet in height, and so far as shape is concerned belongs to the class of tapering cruciform pillars with the limbs cusped.

MONUMENTAL CROSSES.

The crosses upon stone coffin-lids or sepulchral-slabs, which in England first appear at the close of the eleventh century, and from that period gradually became general, were executed either in low relief or by incised lines, while in some instances the two methods of treatment were combined. Occasionally repeated in the same example, the cross sign, exhibiting a truly wonderful variety of design, at first appears alone, the shaft, or stem, almost always considerably elongated, and often enriched with sprouting foliage or some other ornamentation. When the elongated shaft of a cross or slab rises from two or more steps at its base it is said to be a Calvary cross, and after a while a brief inscription was added. Then the further addition appears to have been introduced of some device or figure which symbolized the profession, occupation, rank, or office of the person commemorated — such as a pastoral staff for a prelate, a chalice for a priest, a sword for a knight, a trumpet for a trumpeter, a bell for a bell-founder, a hammer and pincers with a sword for an armorer, a horseshoe and hammer for a smith, etc. In a few instances a knightly sword placed erect in the centre of a slab either acts as the shaft of a cross, or with its cruciform guard to the hilt, the figure of the weapon itself becomes the cross symbol. There are also occasionally found early monumental stones, upon which both a cross and the head or bust and the feet of a human figure are so treated as to form a single composition. Kneeling figures, again, are sometimes introduced either at the foot of a monumental cross or on each side of the shaft of such a cross, and full-length figures in other examples appear placed within the expanded floriated heads of monumental crosses. . . .

QUEEN ELEANOR'S CROSSES.

The marriage of Eleanor, daughter of Ferdinand III, King of Castile, with Prince Edward of England, when fifteen years old, took place in May, 1254, at the castle in Burgos, Spain, and it was on Sunday, August 19, 1274, that Edward I and his Queen Eleanor were crowned in Westminster Abbey. During almost thirty-six years she was the constant companion of her husband on his perilous journeys, while the issue of the marriage was seventeen children — five sons and twelve daughters. Holinshed, in his "*Chronicles*" under date 1291, records: "In the nineteenth yeare of King Edward, Queen Eleanor, King Edward's wife, died upon Saint Andrew's Even at Hirdebie, or Hirdlie, neere to Lincoln, the King being as then on his waie towards the borders of Scotland; but having now lost the jewell which he most esteemed he returned towards London to accompanie the corps unto Westminster, where it was buried in St. Edward's Chapell, at the feet of King Henry III."

[1] Extracts from a paper in the *Illustrated Carpenter and Builder*.

In the solemn procession with which the embalmed corpse was slowly brought to Westminster the King himself was the principal mourner, and that passengers might be reminded to pray for her soul he caused a stately cross to be erected to her memory at every place upon the road where her remains rested — namely, Lincoln, Grantham, Stamford, Geddington, Northampton, Stony Stratford, Woburn, Dunstable, St. Albans, Waltham, Cheapside, and Charing. Dean Stanley, in his "*Memorials of Westminster Abbey*," says: "The crosses erected at all the halting-places of the remains of her kinsman, St. Louis, from Mont Cenis to St. Denis, seemed to have furnished the model of the twelve memorial crosses which marked the passage of the Queen of good memory from Lincoln to Charing."

Holinshed says: —

"She was a godly and modest Princesse, full of pitie, and one that showed much favour to the English nation, readie to relieve everie man's grief that sustained wrong, and to make them friends that were at discord so far as in her laie. In everie town and place where the corps rested by the waie the King caused a cross of cunning workmanship to be erected in remembrance of her, and in the same was a picture of her engraven. Two of the like crosses were set up at London, one at Charing and the other in West Cheap."

At Geddington the cross still exists in the middle of the town where the three principal streets centre. The Rev. C. H. Hartshorne, in "*Historical Memorials of Northampton*," says that the three figures of Eleanor upon this monument exhibit a similar cast of countenance to the others. There exist the same elegance of outline and skilful arrangement of drapery, thus evidently showing that all of them, with the four figures round the cross at Northampton, are copied from the same original. With regard to this cross, a writer says: "The cross at Geddington fares remarkably well. I have never heard of its being defaced, nor have I seen any signs of ill-treatment. The weather, of course, affects it to some extent."

The cross at Northampton, which stands on an eminence about three-quarters of a mile south of the town of Northampton, was the work of John de Bello, or De la Bataille, who also erected the crosses at Stony Stratford, Woburn, Dunstable, and St. Albans, between the years 1291 and 1294. About the base of this cross is a flight of steps. The shaft of this cross is divided into three stages. The first is octagonal, 14 feet in height, and each face of the octagon measures 4 feet. On the south and east sides are the arms of Ponthieu in Picardy, and in another escutcheon those of the kingdom of Castile and Leon. The shaft of the second stage, or story, is of the same shape as the first one, but only 12 feet high. The upper shaft is square, each side facing one of the cardinal points of the compass. Its height is only 8 feet.

Waltham Cross stands on the side of the high-road, where the Queen's body rested. Its erection was begun by command of the King, under the superintendence of Nicholas Dymenge de Reyns, in 1291. Three other persons appear to have had some share in the work — viz., Roger de Crundale, Alexander le Imaginator, and Robert de Corf. The whole cost was £95. It is hexagonal in form and presents three elegantly-constructed stories, each of which is finished by an embattled frieze; at every angle is a graduated buttress ornamented with foliated finials. In the second compartment appear the three statues of Queen Eleanor, the work of William de Ireland.

Another cross stood in the middle of Cheapside, a little to the west of Bow Churchyard, opposite Wood Street. It had originally the statue of the Queen, and in all respects resembled that at Northampton. The destruction of this famous cross took place in 1643.

Charing Cross was the last spot on which the body of Queen Eleanor rested in its progress to Westminster Abbey. The cross was octagonal in form and built of Caen stone, and in an upper stage contained eight figures. The steps and other parts of the fabric were made of marble brought from Corf, for which large sums were paid. Its demolition took place in 1647. The exact spot upon which it stood, according to some historians, is that occupied by the equestrian statue of Charles I.

The modern Eleanor Cross, in front of the Charing Cross Hotel, was erected in 1863, and is a reproduction as near as possible of the old one. It is from the designs of Mr. E. M. Barry, and cost nearly £1,800.

BANBURY CROSS.

It has been safely affirmed that, thanks to the nursery rhyme, this celebrated cross will never be forgotten while the English language lasts. The destruction of the original took place during a riot in the early part of the seventeenth century. Its restoration took place on the marriage of the late Empress Frederick, when it was resolved to restore the cross as the most graceful memorial of that event, and the present elegant structure of hexagonal form was erected from a design by Mr. Gibbs, of Oxford. It is 52 feet in height, of Bath stone, and is divided into three stories, or compartments.

IRISH CROSSES.

Ireland contains a great many stone crosses which are beautifully carved, and it is claimed that they constitute the finest monuments in Europe of the early Christian ages. In all the remains of ancient Irish art there is a peculiar style, the characteristics being interlaced ornaments; bands, cords, serpents, dogs, birds, even human beings are interlaced. There are also other modes — spirals, waves, zigzags, frets, etc. These ornaments display wonderful powers of invention and execution, and entitle the ancient Irish, in the opinion of Mr. H. O'Neill, to rank as the greatest masters of ornamental art t at ever existed.

About thirty-four miles from Dublin, in the County Louth, and some four miles from Drogheda, are situated the ruins of Monasterboice Abbey, consisting of two ancient churches, a pillar, and two very large crosses. The largest, or what is distinguished as the West Cross, is 23 feet high, and is a work of infinite beauty, as it stands amid the ruins of hallowed fanes and long-forgotten altars, presenting an object of the most contemplative interest. The other, known as the South-east Cross, is 17 feet high, and both of them are elaborately carved, while the material is a white silicious stone, close-grained, not unlike statuary marble.

The first panel on the lower part of the West Cross is greatly injured; it represents the soldiers guarding Christ's sepulchre. The second panel is understood to represent Christ's baptism, with the Holy Ghost descending, in what imagination may conceive to be the likeness of a dove. The four succeeding panels are supposed to represent the Transfiguration and other incidents relating to the Saviour. In the centre of the cross is Christ crucified, with the sponge and the spear-bearers.

The arms of the South-east Cross are 7 feet wide, and the shaft is 2 feet 3 inches wide at the base. This cross is composed of three stones; first, the base; the second reaches from thence to the top of the circle; and the third one completes the monument. There is an inscription at the base, "Or do Muiredach las in dernad Chrossa," meaning "A prayer for Murdoch, by whom was made this cross." This Murdoch referred to is supposed to have been Abbot of Monasterboice in A. D. 923. The three groups on the shaft of the cross and the fourth one over the Crucifixion seem to refer to one story; in the lowest group an ecclesiastic is attacked by two armed men; in the next, these men have become students or ecclesiastics; in the third, the ecclesiastic resigns his staff to one and his book to the other.

The Cross of Cory is a beautiful processional cross originally made for the church of Tuam, seat of the Archbishopric of Connaught, and for Muiredach O'Duffy, who died in the year 1150. It was made to enshrine a portion of the true cross by order of King Turlough O'Conor, as may be learned from an entry in the "*Annals of Inisfallen*," A. D. 1123. The annalist states: "A portion of the true cross came into Ireland, and was enshrined at Roscommon by Turlough O'Conor." This statement is supported by inscriptions along the sides of the cross. The shaft of this cross is formed of oak, covered with plates of copper outside. It was concealed at the time of the Reformation and found early in the last century in an oaken chest. It was presented to the museum of the Royal Irish Academy in 1889.

The form of the Irish cross, being that of the Greek cross with arms projecting outside the circle and shaft elongated, is a curious combination of the Greek and Latin cross, and seems symbolic of the whole subject of Irish ecclesiastical art, which, from its very beginning, shows Byzantine and Latin elements commingled. . . .

THE CROSS IN HERALDRY.

In the heraldry of the Middle Ages the form and enrichment of the cross was treated in many ways.

The English cross of St. George is a plain red cross, set erect on a white ground. The Scottish cross of St. Andrew is a plain diagonal cross on a blue ground. The Irish cross of St. Patrick is a plain diagonal red cross on a white ground. . . .

The cross of Passion, when erected upon three steps, is known as the cross of Calvary. The steps allude to the three Christian virtues — Faith, Hope, and Charity.

Many wealthy merchants in the Middle Ages, both in England and on the Continent of Europe, having no armorial bearings, used as their signet, or marks of cognizance, certain monograms. These were invariably of the cross in combination with some other emblem, such as the circle, referring to the globe, the pennon or flag of a ship, or the vane of a weathercock, alluding to the prosperous gales upon which depended the success of their navigation.

MARKET-CROSSES.

The privilege of holding markets was in olden times granted to the monasteries, and the cross was erected, not only as a sign of their jurisdiction and power to receive tolls, but also as a pulpit for occasional religious exhortation. The influence of the cross was acknowledged by the traders, for they were in the habit of appealing by oath to that sacred image, under whose shadow they stood, that their goods were honestly come by and up to the mark. At first these market-crosses were only single cruciform shafts elevated on steps, but after awhile they became decorated with pinnacles, niches, etc., and then later on projections, or arches, were erected to shelter the people from the weather. The cross at Cheddar, for instance, shows the original structure as having been at first merely a simple shaft raised on steps with lateral piers, and a roof was erected at a later period. At Winchester there is still a fine cross known as the Butter Cross, which is on the site formerly occupied by the old market-cross.

The great market-cross of Chichester is another of the very few structures of this kind now standing, and was completed by Edward Storey, Bishop of Chichester, about the year 1500. The worthy prelate left an ample estate to keep his practical monument in repair. The cross is octagonal in plan, and consists of an open arcade of flat, moulded arches with ogee-crocketed heads, flanked by buttresses, terminating in crocketed pinnacles. The clock is a later addition, being the gift of Dame Elizabeth Farrington in 1724, "as an hourly

memento of her good-will." The total height of the cross is 50 feet, and in 1724 it was completely restored at the expense of Charles, second Duke of Richmond.

With regard to the market-crosses of Scotland, there seems every reason to believe that these had their beginning in the cross ecclesiastical, which was erected as the visible ensign of the Christian faith, and that the earliest ones were of wood, but as the missionaries felt their position in the country more assured they erected crosses of stone which at first in shape resembled the wooden crosses. Of the ornamental stone cross ecclesiastic, which succeeded to the plain stone cross of wooden type, many elaborately carved examples still survive. Chronologically parallel with the cross ecclesiastic, for a very long period before the Restoration, the municipal, or market, cross existed where merchandise had to be presented for sale, and where proclamations were made. The market-cross was also the scene and the centre of public rejoicings of all kinds as well as the theatre of public punishment and shame.

The market-cross of Edinburgh was properly that which ranked first in importance in royal and other proclamations. After that, perhaps, no market-cross in Scotland was associated with so many stirring events of public interest as that of St. Andrew's, which was removed in 1768. The market-cross, as an institution, has now all but fallen into desuetude.

A SEWAGE-DISPOSAL SYSTEM FOR A COUNTRY-HOUSE.

MY work as sanitary engineer brings me in constant touch with the architectural profession, and I have found that the question of a properly designed sewage-disposal system for a medium-sized and moderate-priced country-house is rarely thought of, on account of the cost.

It is with this in mind that the writer shows herewith a sub-surface disposal-system for a house of three bath-rooms, of about twenty-one fixtures, and which has been built within sixty miles of New York City. The house contained the following fixtures: —

Basement: one water-closet, one sink, one set (three) laundry-tubs. First story: one water-closet, one pantry and one kitchen sink, one basin. Second story: two water-closets, two baths, one slop-sink, five basins. Third story: one water-closet, one bath, one slop-sink, one basin. A total of twenty-one fixtures.

A sewage-disposal system may be located at any distance from the house, depending upon the size of the property; in one case, the basins were but 60 feet from the house; in general, however, 200 feet is a good distance.

The sewage-disposal system under discussion consists of a 5-inch sewer of earthenware pipe, with cemented joints, running from house to the basins; the two settling-basins with the adjoining siphon-chamber; the 4-inch line from the siphon to the irrigation-field; and the irrigation-field. [See Illustrations.]

The house-sewer is laid with great care. The settling-basins consist of two chambers built to contain sewage without a possibility of leakage. The first basin is to be of sufficient size to contain one day's supply of sewage from the house, the second basin to be of somewhat large size. The siphon-chamber contains the siphon; and is for making any needed repairs to the siphon and for inspection. The line from siphon to irrigation-field may be of any length, but in this case was about 60 feet long, and of 4-inch earthenware pipe with cemented joints. The irrigation-field consists of a series of lines of small porous irrigation-tiles, in this case 3-inch, laid about 10 inches below the surface of the ground and well covered by small stone.

The general dimensions and quantities shown are from data obtained by the writer from observation, and are used in all his works with but slight modifications.

The theory of sewage-disposal by sub-surface irrigation may be thus summed up: The sewage from the house is to be disposed of as soon as possible. The sewage reaches the first of the settling-basins, where bacterial action immediately takes place, breaking down the organic bodies. In this basin precipitation occurs. The now somewhat clarified sewage enters the larger basin, where another period of rest takes place. When the sewage in this basin has reached a certain determined height, the seal in the siphon in the adjoining chamber breaks and the entire contents of the basin is sent to the irrigation-field. The small tile, having a covering of broken stone, are surrounded by a large volume of air, which immediately attacks the sewage, throwing off hydrogen and nitrogen, the latter being eagerly sought after by the roots of the plants in the soil above.

The irrigation-field should be selected with great care. It should have a southern exposure, with sandy soil, and not be near a stream or brook. Should the soil be poor, heavy or of clay, then the "field" should contain more tile. Should shaded land only be available, then, too, more tile will be necessary.

The method of running the lateral irrigation-tiles is entirely governed by the contour of the surface of the ground. They may be laid in curved lines, or in lines at right angles to the main distributor, or, again, the distributor may be branched, and two "fields" may be formed. The lateral tiles should have a fall of about 3 inches per hundred feet, the main distributor a fall of about 6 inches per hundred feet.

The lateral 3-inch tiles are laid with caps and gutters, the former keeps small stone or earth from entering the pipe and the latter provides a permanent bed for the pipe. They provide an easy means for inspection or for making repairs or additions.

It often happens that on account of the flatness of a tract of land, the use of a siphon on account of its depth is out of the question. In such a case both basins should be built much larger, and all openings should be provided with screens of ¼-inch mesh, of galvanized ware, and the sewage be allowed to enter the 3-inch lines direct; the field, too, should be made much larger.

The cost of the above work, the settling-basins and the field only, was about $230.

WM. C. TUCKER.

BOOKS AND PAPERS

IT is a little startling to any one who has seen the long rows of books in every library treating of Italian sculpture, Italian art, the Cinque Cento, the Renaissance in Italy, and the histories of Florence, Milan, Rome, Venice and Sicily, to hear that there is no history of Italian architecture in English; and architects, most of whom consider themselves tolerably familiar with all the principal buildings in Italy, will, at first, be inclined to question the statement with which Mr. Cummings introduces his book;[1] but, on reflection, it will probably appear that the knowledge which most people possess of the best-known buildings in the world is a collection of fragments, picked up, bit by bit, from local annals or from critical essays; and that a connected history of the development of Italian architecture, from the decadence of the antique to the Renaissance, has not existed, at least in a form available for English readers, until Mr. Cummings undertook to supply the want. This task he has fulfilled with the most painstaking care, and with corresponding success. Not only have the abundant sources of fragmentary information been collated, and what they could furnish properly connected with the rest, but Mr. Cummings has examined most of the buildings of which he speaks on the ground, with his manuscript in his hand, modifying where his trained intelligence showed him that the accepted conclusions were questionable, and, in many cases, adding observations of the greatest value and interest. In these, as well as in the clear presentation of the facts, as distinguished from theories and errors, in connection with familiar buildings, the professional reader will find great pleasure, and every reader must be charmed with the pure English in which the ideas are expressed, and with the beautiful and well-selected illustrations.

Mr. Cummings begins with the catacombs, in which the origin of Christian architecture is now generally sought, giving a particularly interesting description of the chapels built either in the catacombs or in close connection with them. From these it is an easy transition to the basilicas; and, in fact, the first Christian basilicas were themselves built in connection with catacombs or with other places of sepulture of martyrs or saints. Mr. Cummings does not go so far as Mr. Lowrie and the Germans in rejecting the theory of the adaptations of the judicial basilicas to the uses of Christian worship, but he says that the extent to which the former were copied in the Christian basilicas "has been greatly overstated." He mentions that the basilica, or hall of justice, in Nero's palace of the Lateran, was transformed under Constantine into a Christian church, in connection with the papal residence established at the same time in the palace; and it is not likely that so conspicuous an example would have been wholly ignored.

The basilicas lead naturally to the great churches which have succeeded them, and which, in many cases, stand on the site of those of Constantine and his successors. It is difficult to say in some cases how much of the original building still remains in the present structures, and it is necessary, for the proper study of the style, to show photographic plates of St. Paul without the Walls, rebuilt since 1823, close to those of St. Agnes, perhaps fifteen hundred years older; but St. Paul was rebuilt substantially in the old form, and by no other method could the architectural development of the characteristic Roman basilica have been shown.

The period of basilica-building in Rome was followed by the brilliant reign of Theodoric in Ravenna, and the construction of the remarkable group of churches, half Roman and half Byzantine, which still stand to attest the vigor of the new Gothic element which had invaded Italy. Every one knows the magnificence of the Ravenna mosaics, but it is, perhaps, not so much in these as in the curious blind arcades at the top of the walls of the churches, and in certain other Northern characteristics, that we trace the artistic movement which developed, long afterwards, into the Romanesque of North Italy.

The power and wealth of the Gothic conquerors are strikingly shown by these and the other splendid buildings erected under Theodoric and his immediate successor, yet, a few years later, the body of Theodoric was taken from his magnificent mausoleum, the roof of which is of a single stone, 35 feet in diameter, and was carried by the remnant of his people, fugitives before the Byzantine armies of Belisarius and Narses, and thrown into the centre of Vesuvius by the handful of despairing Goths who had escaped the sword of the Greeks.

[1] "*A History of Architecture in Italy*," from the Time of Constantine to the Dawn of the Renaissance. By Charles A. Cummings, Fellow of the American Institute of Architects. With nearly 500 illustrations. New York and Boston: Houghton, Mifflin & Co. 1901. In two volumes. Price, $7.50.

The extirpation of the Goths, who, it is interesting to remember, came from the island of Gothland, in the Baltic Sea, and were so closely related to our own Anglo-Saxon ancestors that the translation of the Bible made by the Gothic bishop Ulfilas is easily understood by English readers, was followed by the invasion of the Lombards, who fixed themselves firmly in Northern Italy. Mr. Cummings presents an interesting study of the Lombard institutions, and the development of the organization of mechanics through which the Lombard manner of building was formed, and carried over nearly all Italy. It is remarkable, considering the original barbarism of the Lombards, that their masons very soon undertook the vaulting of their churches, using independent ribs, both transverse and diagonal, and even anticipating the French architects of three or four centuries later, by slightly pointing the diagonal ribs, to give greater stability to the vault.

After a long and most interesting chapter devoted to the Lombard architecture and the Byzantine influence upon it and other Italian work of the period, notably in Venice, Mr. Cummings turns to what he calls the Central Romanesque, or that of Tuscany, and then to the South, giving a great deal of new and valuable matter about the curious Norman-Byzantine-Moorish architecture of Sicily and Apulia. This brings us to the Gothic; and here, although the ground is tolerably familiar to most of us, he supplies much new and interesting detail. Speaking, for example, of San Petronio, at Bologna, the finished portion of which is, perhaps, the most beautiful piece of Gothic work in Italy, he mentions the competition which was held, about 1535, when the Renaissance was in its full glory, for designs for completing the front of the Cathedral, nearly all of which is still in rough brickwork, the Gothic facing of the fourteenth century never having been carried up above the arches of the doors. Palladio, Vignola, Baldassare Peruzzi, Giulio Romano, and some twenty-five others of the most distinguished architects in Italy competed, and their drawings are still preserved in the sacristy of the cathedral. It is remarkable that Baldassare Peruzzi and Giulio Romano sent in Gothic designs, although both of them were among the most distinguished leaders of the Renaissance, and, at this period, the Gothic style had been, for nearly a hundred and fifty years, regarded in Italy as antiquated and barbarous. Apparently, these great men, recognizing and respecting beauty, even in a discredited and unfashionable style, had, like true artists, chosen to complete the work of another, in preference to displaying their own skill in a style of which they were recognized masters. None of the designs were carried out, and the church remains with its rough brick front to this day, but it is much to be wished that the competitive drawings could be published for the benefit of the community.

It has probably already occurred to the reader of these notes that Mr. Cummings's volumes would make an excellent companion, either for an architect on a vacation tour in Italy, or for a student intent upon serious work among Italian architecture; and they are in every way admirably adapted to such a purpose, being moderate in size, although not so small as to spoil the illustrations, and as light as the quality of the paper required for proper rendering of the illustrations will permit, while the general reader, and the lover of beautiful books, will find in them perfect printing, both of text and illustrations, good binding, and excellent proof-reading. The last is a quality of much greater value than publishers in general seem to suppose; and it is a satisfaction to the professional man to be able to read about Italian architecture without stumbling over references to "Pope Damascus," and the "Palace of Diocletian at Spoleto," which disfigure a recent book on the subject, otherwise in every way admirable.

It is not only with the greatest interest and pleasure, but with no small pride, that we look over Mr. Lowrie's book,[1] one of the first important fruits of the opportunities given by the American School for the study of antiquity at Rome, and a work which would do honor to any scholar, of any nation. For the general reader, no more attractive theme could have been chosen in the whole range of archæology. Notwithstanding the opinion of the distinguished divine who came to the conclusion that martyrdom was merely a fashionable craze among the early Christians, and that they rather enjoyed being devoured, the world at large, both Protestant and Catholic, cherishes with daily increasing veneration the memory of the people who met death, kneeling hand in hand in the arena, to bear witness of their belief in the crucified carpenter's son, and their devotion to his doctrine of love, and welcomes with eager interest everything that can bring us nearer in imagination to the love-feasts, in which masters and slaves joined, in humble obedience to the words of their Master, and to the burial services in which, for the first time, perhaps, on earth, the sorrow of separation was turned into joy by confidence in a Divine revelation of immortality. In this field there is much work yet to be done, but it is a matter of congratulation for readers of English that the investigations which Lanciani, in his "*Christian Rome*," hardly more than suggested, should have been carried on with such skill and learning, as well as with such sympathetic insight, as Mr. Lowrie has shown. It is hardly necessary to say that the five hundred and fifty miles of galleries in the Roman catacombs, to say nothing of those in other parts of Italy, and the thousands of Christian monuments, as yet almost unknown, in Syria and Africa, will furnish, for many years to come, new illustrations of the faith and life of the early Church; but these will be much more correctly and easily interpreted if the preliminary steps in investigations of the kind are carefully taken.

Naturally, the most characteristic works of the Christians of the early Church in Rome are found in the catacombs, and Mr. Lowrie begins his book by a most valuable chapter on the origin and use of these subterranean burial-places, upsetting, in the course of it, some cherished theories in regard to their having been abandoned quarries, utilized by the Christians for their purposes. As all the Roman catacombs are cut in a granular tufa, useless for construction of any kind, it is evident that they must have been excavated with a definite intention; and, as nearly all of them are comprised within the boundaries of what were then, in all probability, enclosed gardens, the inference is that they were, in most cases, formed by permission of the owner of the ground, who may have been a convert, or, at least, a favorer of the new doctrine; and the few instances in which the catacombs proper connect with sand-pits or quarries seem to have been due either to the desire to utilize a disused space for disposing of the material excavated from the new galleries, or, possibly, in some cases, to the wish to make available an additional mode of egress in times of persecution. The rock, within the boundaries of the lot devoted to the burial-place, is perforated with galleries according to a definite plan, often in two or more stories; and the recesses, or *loculi*, in which the bodies of the dead Christians were laid, were regularly cut, either in the walls of the passages, or around little chambers, apparently devoted to families, as the case might be. So far as the means of the surviving relatives would permit, the burial-chambers, or the covers of the *loculi*, were decorated with painting or sculpture of a character which is artistically of the greatest interest, forming, as it does, a step in the transition between the refined but unsympathetic perfection of the antique and the expressiveness of mediæval art. It is true, as Professor Wickhoff shows in his beautiful work on "*Roman Art*," that a great change came over even Pagan sculpture under the Empire, in the direction of freedom and naturalism in the study of ornament, and of expression in portraiture; but whether this change was due to the influence of Christian artists on their Pagan brethren, or whether the Pagans set the fashion for the Christians, or whether both Pagans and Christians were unconsciously affected by the new spiritual light which had begun to shine in the Roman world are questions which people will long take pleasure in trying to answer.

After the catacombs, the study of which forms the natural introduction to that of ancient Christian art in general, Mr. Lowrie takes up the architecture of the basilicas and other ecclesiastical buildings of the early Church. In regard to the origin of the Christian basilica, he, like other recent writers, rejects entirely the theory that it was simply an adaptation of the judicial basilica familiar in all Roman towns. Those of our readers who have studied the history of architecture from the ordinary text-books will remember that they agree in asserting that the decay of the Roman power under the later Empire, and the crowding of the rural population into the capital, had caused the abandonment of the public buildings of many provincial towns, and that the Christians, after their worship was permitted by law, appropriated the disused basilicas, or court-houses, for the use of their congregations; and even the details of the civil basilicas, such as the seats for the judge and the lawyers in the apsidal "tribune," corresponding to those of the bishop and inferior clergy in the sanctuary of the Christian church; the altar in front of the tribune, where the judges took their oath before the assembled people to execute justice, corresponding to the primitive position of the altar in the Christian churches; and even the "cancelli," or railings, which divided the tribune from the main body of the building in the judicial basilicas, as they still do the chancel from the nave in ecclesiastical buildings, are given in most books with such completeness that it is difficult to question the analogy. Mr. Lowrie, however, says that there is not a single instance recorded in the history of the Church in which a secular public building of this kind was appropriated to Christian worship, while all the secular basilicas, the ruins of which still remain, show a disposition of plan quite different from that familiar in the Christian basilicas. It is true that there is a striking coincidence in name between the pagan hall of justice and the Christian place of worship, but he says that the word "basilica," or "house of the king," or "master," was used so widely under the Empire to designate any state apartment or place of public business, that its adoption by the Christians to denote the house of their Divine Master was quite natural. Instead of the civil basilica, he thinks that the type of the Christian house of worship is easily found in the ordinary Roman or Italian dwelling. Every such dwelling contained, as its principal apartment, an atrium, or hall, generally surrounded by a colonnade, which served for the reception of friends, and undoubtedly, for the meetings of the little congregations of Christians in the earlier period. In the larger houses, the atrium formed a preliminary reception-room, intended particularly for strangers, or visitors on matters of business, while the family and its friends met in the peristyle, a larger room, also surrounded by a colonnade, beyond the atrium, and connected with it only by a narrow passage. Whether the atrium or the peristyle was the family reception-room, the arrangement was nearly the same, a recess, or tablinum, in which stood the family altar, always opening from it, on the side facing the entrance, while two other recesses, or small rooms, opening from the sides of the main room, at the upper end, near the altar, usually contained portraits of the ancestors of the family. These "wings," or side rooms, developed very naturally

[1] "*Monuments of the Early Church:*" By Walter Lowrie, M.A., late Fellow of the American School of Classical Studies at Rome. New York: The Macmillan Company. 1901. Price $1.75.

into the transepts of the Christian church, which have no counterpart whatever in the civil basilica; and the colonnades of the atrium or peristyle, separating the central space from an encircling passage-way, served, probably, in the churches, as in dwellings, for a needed separation between the professed Christians who participated in the service in the central space and the interested spectators just outside the columns. Even the less simple dwelling-house plan, including both atrium and peristyle, was transferred to the larger churches, particularly in the East, where the atrium became the "narthex," or porch, in which the unbaptized remained, seeing and hearing what they could of the service through the open doors. The tablinum, or altar-recess, was transferred, almost without change, to the larger building, as were also the transept-like wings, which, in the earlier basilicas, were proportionally small, and seem to have been used as sacristies or chapels. The main difference between the Christian basilica and the domestic reception-room lay, of course, in the extension of the colonnade of the former vertically, in the form of a clerestory wall, in such a way as to permit the roofing of the nave, at the same time that light and air were admitted by the clerestory windows. Mr. Lowrie thinks that the peristyles, or, at least, the atria, of dwellings may sometimes have been covered and lighted in the same way; but, although this seems perhaps questionable, it is certain that such an expedient would readily occur to the bold and resourceful Roman architects as soon as the proposed dimensions of such a building made something of the kind necessary.

We should be glad to follow our author farther into his deeply interesting study of the development of the Christian house of worship, as well as to say something about the succeeding chapters, on painted decoration, sculpture and vestments in the early Church, but space does not permit, and we must refer our readers to the book itself, in which students of the history of art will find equal pleasure and instruction.

SOCIETIES

DETROIT ARCHITECTURAL CLUB.

THE Detroit Architectural Club, through the Educational Committee, instituted some time ago a competition among its members, the subject being a design for a country residence to be located in a suburb of Detroit on the shore of Lake St. Clair, the lot to have a lake and street frontage of 200 feet. Besides the residence the sketches were to include buildings for saddle-horses, hounds, and automobiles, a greenhouse and a boat-house. Numerous designs were submitted. At the last regular meeting of the Club, Architect J. W. Case gave a criticism on the different designs, awarding First Mention to J. J. Fraunfelder; Second Mention to George V. Pottle; prize for First Mention being a handsome bronze medal; for Second Mention, a set of books.

A competition has also been held to procure a design for a book-case to be placed in the club-room. Architect Albert Kahn gave a criticism on the drawings submitted. The design submitted by A. Eisen was adjudged as the winning design.

The Club has now constituted and under way a competition for a band-stand to be located on Belle Isle. The construction for same may be of stone, brick or terra-cotta. All drawings must be in the hands of the Secretary on Monday, February 24, 1902. Architect William B. Stratton will judge them and render criticism.

A. EISEN, *Chairman Publicity Committee.*

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

NEW WILLARD HOTEL, WASHINGTON, D. C. MR. H. J. HARDENBERGH, ARCHITECT, NEW YORK, N. Y.

THE interior of the building, decoratively considered, has received the following treatment: —

Dining-room: Woodwork of dark English oak; columns of dark green (Alps-green) marble; caps, gold; ceiling-beams of dark oak; panels and decoration in greens, brown and gold. Palm Court: Pompeiian decoration. Main Lobby: Columns and pilasters of Siena marble; caps, gold; walls of Venetian red; ceiling in buff and gold. Ball-room: Woodwork enamelled, ashes-of-rose with delicate pink panels. Banquet-room: Woodwork enamelled ivory-white with delicate green panels.

SCALE DETAILS OF THE SAME.

RESIDENCE FOR MRS. WILLIAM L. SKINNER. MESSRS. VAS & TAKACH, ARCHITECTS, NEW YORK, N. Y.

THE construction of concrete houses has hitherto been in disfavor owing to the lack of a suitable style which could be properly shown by such material. In the construction of the residence as illustrated, the most stringent rules of architecture have been obeyed; that is to say, stability, usefulness and beauty have been obtained by the combination of the style with the material best suited to the beauties of that style. The walls, floors, partitions and roof will be a combination of iron and concrete. The combination has been so designed that the floors are never more than nine inches thick. The wall-construction is the same as the floor-construction except that a hollow space of two inches is provided, thus securing a minimum of material and the greatest amount of strength and comfort to those who occupy the house. The most novel feature of the house is in the finish of the floor-surfaces. No wood whatever will enter into the construction of the floors. On the top of the concrete-and-iron combination, there will be a finish in natural cement, which will be continued up on the partitions and walls, to form a moulded base-board. Between the base-mouldings and on the surface of the cements will be laid thick linoleum of suitable design to harmonize with the decoration of the room in which it is laid.

A SEWAGE-DISPOSAL SYSTEM. MR. W. C. TUCKER, ENGINEER, NEW YORK, N. Y.

FOR description see elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

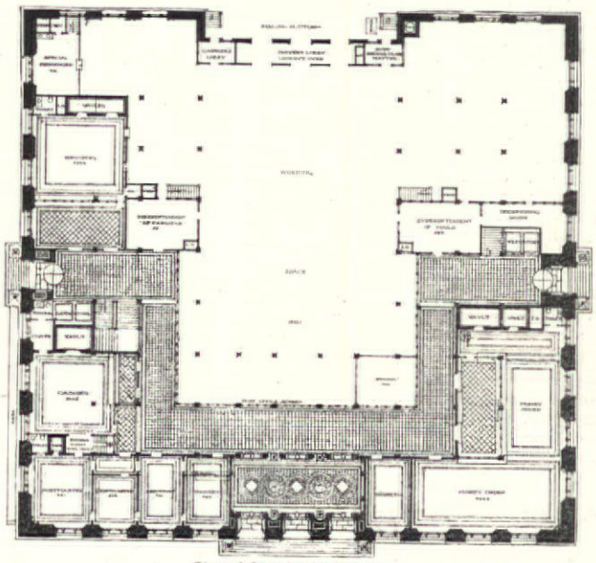
THE BELFRY AND THE CATHEDRAL OF ST. BAVON, GHENT, HOLLAND.

[Additional illustrations in the International Edition.]

THE ARCHITECTURAL BUILDING: HARVARD UNIVERSITY, CAMBRIDGE, MASS. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

ENTRANCE TO THE PRUDENTIAL LIFE BUILDING, NEWARK, N. J. MR. GEORGE B. POST, ARCHITECT, NEW YORK, N. Y.

A COMPETITIVE DESIGN FOR THE UNITED STATES POST-OFFICE, COURT-HOUSE AND CUSTOM-HOUSE, CLEVELAND, O. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.



Plan of Cleveland Post-office.

ENTRANCE-HALL: ARCHITECTURAL BUILDING, HARVARD UNIVERSITY, CAMBRIDGE, MASS. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

NOTES AND CLIPPINGS

THE DESPOTISM OF TRADE-UNIONS. — At Franklin and Marshall College Chapel recently, George F. Baer, President of the Board of Trustees of the College and President of the Philadelphia & Reading Railway and the Central Railroad of New Jersey, delivered a lecture on "Work is Worship," in which he severely denounced labor-unions. He said in part: "To-day there is no greater absolute despotism and tyranny on the earth than the power which forbids a man to work because of some other man's quarrels. In some trades employers are not

permitted to employ workmen without labor-organization cards. Union men will not work with non-union men. Was ever greater tyranny practised by one set of men over their fellow-men? So apathetic has the public conscience become to the terrorism, tyranny, and lawlessness of labor organizations that not only the politicians, who are seeking votes, but well-meaning men, who ought to know better, cry aloud against the decrees of the courts when the principles of Constitutional liberty are invoked in legally established tribunals to restrain the lawlessness of labor organizations. Labor may organize, but it may not tyrannize. Labor organizations hitherto have failed because they have entirely overlooked these simple fundamental truths. The modern theory of labor organizations seems to be that the employer and employé are to be divided into two great hostile camps, armed and fully equipped, at a given signal, to engage in industrial war. Peace is only to be a temporary thing, brought about by formulating a truce between the two contending armies, which shall terminate at the end of the year. In the meantime, the leaders of the hostile camps are to be fully occupied during the whole of the year in adjusting the thousand and one vexatious misunderstandings as to the true meaning of the terms of the truce. The business is to be carried on by divided authority, each hostile camp having representatives to determine when and how the work shall be done. This is violating the old rule that 'No man can serve two masters.' If it continues, the present industrial supremacy of the United States will soon be a thing of the past, and we will share the fate of England. It is beyond question true that the primary factor in the decadence of England's industries has been the arbitrary exactions of trades-unions. The London papers continue to call attention to the crisis in British industry, and practically agree that British workmen through their trades unions are ruining not only themselves but the industry of the country. — *Exchange.*

Lord Leighton's House declined. — The *Times* says that the Kensington Borough Council, on the recommendation of the Libraries Committee, has declined to proceed further for the transfer of Lord Leighton's house. The proposal to hand this beautiful building to the public has therefore fallen through.

State Highway Work in Massachusetts. — In the last season's work of the Massachusetts State Highway Commission some 27 miles of new roads were added to the State's system, these and the more extensive work done on old roads being the proceeds of the $500,000 which the Commission has decided to spend a year. Since the plan of State activity in the construction and supervision of highways was adopted in Massachusetts 888 miles of road have been built, or about half of the 10 per cent of all roads in the State, which, to live up to the French standard, the Commission will have to improve. Most of the main lines, such as the one from Boston to Springfield, from the end of Cape Cod to Fall River, from Pittsfield to the New York State line, the northern route from Boston west, the roads from Boston to Lowell, and from Boston to Providence, are being advanced in satisfactory fashion toward completion. Especially ready coöperation with the work of the Commission has been carried on by the towns in the southeastern part of the State, but a growing interest in the enterprise of the State and an increased disposition to profit by the Commission's experience and construction have been displayed by communities in all sections. Much of the new road built in Massachusetts has cost about $5,560 a mile, though the average for the State, owing to the grades met in many sections, amounts to about $7,500. The material was macadam. Maintenance charges run about $100 a mile a year. The Commission has succeeded in keeping costs something under the levels at which they began, and this has helped to win popular approval for the work. Concerning the benefits coming from it, the Massachusetts folk seem to be of one mind. Time saved in travel, less strain on horses and vehicles, economy of power in transit, this last often reaching 33, and even 50 per cent, cheaper and more expeditious access to markets, and more trade and benefit from casual visitors, or more or less permanent residents, attracted by the excellence of the roads, are among the advantages claimed, and apparently with justice, as the results of the Commission's work. — *N. Y. Evening Post.*

Proposed Statues of Sherman and Longfellow. — A bill has been introduced in the Senate by Mr. Foraker providing for the erection of a statue of the late John Sherman in Washington, to cost $50,000. Mr. Wetmore, of Rhode Island, submitted favorable reports from the Committee on the Library, on resolutions authorizing the selection of a site and the erection of a pedestal for a bronze statue in Washington, in honor of Henry Wadsworth Longfellow, to cost $4,000, and for completing a monument to the memory of Dorothea Lynde Dix, for which $10,000 is appropriated. — *Exchange.*

Gigantic Dynamos for Niagara. — The *Electrical World and Engineer* contains an article commenting on the notable development of the Canadian Niagara power-plant. The article is in part as follows: On the American side, where all the work has been done hitherto, newer machinery of the very latest type of its class has just been ordered, while for the hitherto unattempted utilization of the water-power on the Canadian side of the great cataract, the Niagara Falls Power Company has just given a contract to the General Electric Company for three immense units of 10,000 horse-power each. These machines are not only to be the largest electric-generators ever built, but they will embody features of design of the utmost significance, altogether aside from the fact that the new work is to be done under American initiative with American capital and employing American apparatus. We understand from the Canadian Niagara Power Company, which has just awarded the contract, that these gigantic generators are but the first units in a plant which will probably reach an aggregate of 200,000 horse-power or more within a very few years. The power-house is to be situated on the flat land adjacent to the Dufferin Islands near the river, less than a quarter of a mile above the Horseshoe Falls. A wheel-pit is being excavated in the rock, which will be connected by a tunnel tail-race to the gorge below the Falls. The dynamos will be placed at the surface-level as before, being connected to the turbines by long vertical shafts, which extend to the bottom of the pit, where the turbines will be situated. The machines contracted for are, as already noted, far larger in capacity than any electric-generators previously built. They are also remarkable on account of the high speed at which they will operate, 250 r. p m., the same as that now used with the smaller 5,000-horsepower generators on the American side. This, it may perhaps be worth noting, is the third large contract for generators at Niagara Falls which has been awarded to the General Electric Company during the past twelve months. All will be built at Schenectady.

The proposed Anglo-American High Building in London. — The London County Council refused January 20 the application, in behalf of an Anglo-American syndicate, headed by Sir Charles Rivers Wilson, for a 999-year lease of a site on the north side of the Strand, with a frontage of 750 feet, and with still larger frontages on the new streets coming out on the Strand, for the erection of an office-building on American lines, to cost $2,000,000. The Council took the ground that such a length of tenure practically amounted to selling the freehold, which was not within its power; but announced that it was willing to negotiate on the basis of a 99-year lease. — *Exchange.*

Rare Finds in Armenia. — The interest of the German Government in the Bagdad Railway has led it to dispatch important missions to Armenia for the purpose of making archæological explorations in Armenia. The first of these expeditions was intrusted to Dr. W. Belck alone, and in 1898 and 1899 he was accompanied by the Assyriologist Dr. C. F. Lehmann. The report of these expeditions has just been issued, and the results to science are most important. The first indications of a civilization in the mountain-lands bordering on Lake Van were made known by the French traveller Dr. Schultz, who copied a number of inscriptions on the rocky walls of the fortress of the city of Van. Schultz, unfortunately, was killed by the Kurds, but his diaries and copies of inscriptions were recovered and published by the French Government in the *Journal Asiatique.* Layard, who visited Armenia in 1849, copied a number of inscriptions, and Rassam, who made several visits to the country and excavated at Toprak Kaleh, the ancient palace of the Vannic kings, copied or took casts of several more, but the work of the German expeditions has greatly increased our knowledge of the country. The members collated all inscriptions previously copied, and increased the material for the study of ancient Armenian history by nearly two thousand lines — including the discovery of a most important and fairly lengthy bilingual inscription in Assyrian and Vannic. The most important result of the expedition has been to define clearly the extent of this empire, which had almost entirely disappeared from the field of history. The capital city was Van, on the lake of that name, called Dhuspas — the Tosps of the classics — but the royal residence seems to have been at Toprak Kaleh, called at a later period "Rusas town." The northern boundaries of the empire are uncertain, but several inscriptions were found in Russian Armenia. On the east the inscriptions were found as far as Lake Uromiyeh, and one on the rocky heights near Rowandiz, on the summit of the Pass of Keli-shin, 12,000 feet above sea-level. This inscription was first discovered by Sir Henry Rawlinson, and was set up during the joint reigns of the Kings Ispunis and Menuas, about B. C. 800. Westward, on the rocks at Palu, on the Euphrates, near Malatiyeh, the inscriptions of Menuas are also found. — *Paris Messenger.*

How Italy deals with Railroad Strikers. — The *Official Journal* of January 25 announces that the Government has taken a decided stand in view of the rumors of an impending strike upon all the great railways in Italy. The Cabinet announces that it cannot consider a railway strike, affecting, as it does, great public interests, in the same category with a strike of ordinary workers, but will class such an action as a strike of public servants, punishable under the penal code. While determined not to allow a railway strike, the Cabinet recognizes the right of the working-classes to improve their own condition, and therefore the Government has approached the railway-companies with a view of obtaining the desired concessions, which it is confident it can do. — *Exchange.*

Art in French Toys. — The thorough manner in which the French Government interests itself in art matters is once more shown in the prizes offered by the city of Paris for the best new toys seen at the great New Year's Day sale along the boulevards, when miles of booths devoted to the display of toys and holiday wares are erected for a fortnight. Twenty prizes went to the designers or inventors of toys, not exceeding three francs in value, which showed the most originality and artistic taste. — *N. Y. Evening Post.*

Art in the Common Schools. — A few days ago a little boy came into a certain library with a penny picture of a cold, flabby modern German Madonna, and said to the librarian, "Will you please tell me if this is beautiful?" The librarian told him that she thought it hideous. "Oh, I'm so glad," said the child. "Teacher gave us each a picture, and told us to live with it until we could see all its beauty, and I've lived with this for three weeks, and the more I look at it the homelier it seems to get." — *Library Journal.*

The Cresson Bequest to the Pennsylvania Academy of Fine-Arts. — By the will of Mrs. Priscilla P. Cresson, of Philadelphia, a trust-fund of $500,000 is created, the interest to go to the Pennsylvania Academy of Fine-Arts to pay the expenses of promising students who wish to study art abroad. Mrs. Cresson's husband died in 1899 and left $200,000 for the same purpose. — *Exchange.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, MARCH 1, 1902 No. 1366

CONTENTS.

SUMMARY: —
The Competition for the Grant Memorial at Washington. — The Charleston, S. C., Exposition. — Exhibitions of the National Sculpture Society. — Thoughts suggested by the recent Address of Mr. Brooks Adams on the Value of Public Art. — Additions to the Collections of the Boston Museum of Fine-Arts. — The Municipal Art League of New York and Street Refuges. — Railway to the Tombs of the Chinese Emperors. 65
NOTES ON IRON AND STEEL CONSTRUCTION. — IV. 67
OWNER'S RESPONSIBILITY FOR PAYMENT OF PROVISIONAL SUMS. . 70
BOOKS AND PAPERS. 70
ILLUSTRATIONS: —
Section, Plan and Elevation: United States Post-office and Court-house, Elmira, N. Y. — Staircase Detail in the same Building. — Detail of Front Entrance to the same Building. — House of D. E. Norton, Esq., Euclid Ave., Cleveland, O. House on the Avenue Malakoff, Paris, France; — House on the Rue de la Convention, Paris, France.
Additional: Dining-room: Hotel Manhattan, New York, N. Y. — Interior Door: Hotel Manhattan, New York, N. Y.—Street Fronts, Brussels, Belgium: Two Plates. 71
NOTES AND CLIPPINGS. 71

AN important competition is to be closed April 1 next, for the statue or memorial to General Grant, to be erected in Washington. The competition was announced a year ago, and those wishing to compete were required to send in their names before January 1 of this year. Thirty-six artists have responded to the invitation, including Cyrus W. Cobb, C. E. Dallin, T. Massey Rhind, Franklin Simmons, F. W. Ruckstuhl, Henry Niehaus, John J. Boyle, H. K. Bush-Brown and other sculptors, and, among architects, Warren, Wetmore & Morgan, Lord & Hewlett, George Keller, Ackerman & Ross, Lopez, Robb & Hornbostel, and Clarence Luce. Competitors are required to submit models, at a scale of one inch to the foot. Under the terms of the competition, all the models are to be exhibited for two weeks, and six are then to be selected, the authors of which will be paid one thousand dollars each. The final selection, carrying with it the execution of the work, will be made from among these six.

ACCORDING to the newspapers, the Exposition at Charleston, South Carolina, has not, so far, been very successful. The attendance is small, and almost exclusively local, the Northern tourists who were expected to flock to Charleston being very conspicuous by their absence. It is possible that the visit which President Roosevelt has promised to make will do something to revive outside interest, and, as the season advances, many of the Northerners now in Florida are likely to stop over a day or two in Charleston on their way home; but, the prospect certainly is that the South Carolina Exposition will suffer, even more than the one at Buffalo did, from the weariness and indifference with which most people now regard great exhibitions of any sort. To a certain extent, also, the Exposition at Charleston is at a disadvantage, as one anywhere in the far South would be, from the prevailing opinion in the North and West in regard to Southern civilization. Of course, the few Northerners who have friends or relatives at the South know that South Carolina, Georgia, Alabama, Mississippi and Louisiana are full of intelligent and good people, whom we may well be proud to own as fellow-citizens; but the average Northerner, who gets his ideas of conditions south of Mason and Dixon's line from the newspapers, firmly believes that the people of the South find their principal amusement in burning negroes alive, or hanging them and "riddling them with bullets," with, occasionally, a "race war" to call out a large number of people. It is true that these occurrences take place in the remote country-districts, and only involve a small fraction of the population, and it is quite possible that the people hung or shot or burned deserve their fate; but the undisputed fact that such things happen almost daily in the South, and the knowledge that a Governor of a Southern State has found it necessary, in an official message, to deplore the carelessness in such matters which led some of his fellow-citizens to lynch a man for a crime committed at a distance, and then, after packing the corpse in salt, and forwarding it for identification to the scene of the crime, to find out that it was the wrong man, have given Northern people a horror of what they suppose to be Southern ways which it will take generations to overcome.

THE National Sculpture Society, which has not held an exhibition for three years, proposes this year to have two, one in April and the other in October. The April exhibition is to be held at the rooms of the National Arts Club, 37 West Thirty-fourth Street, New York, and will be devoted to statuettes, medals, bas-reliefs, small busts, and sketches or models for larger works. These smaller objects do not get the attention that they deserve when shown with life-size or heroic subjects, and for this reason the Society has decided to try the experiment of exhibiting them separately. In October, an exhibition of larger works will be held in the Madison Square Garden, in connection with the exhibition of the New York Florists' Club. Every one remembers the success of the Society's last exhibition, in which the subjects were shown with a background of plants, and the same effect, on a larger scale, should be still more attractive.

MR. BROOKS ADAMS, it seems to us, is seriously misleading the public in some of his recent papers on the commercial value of public art. Quoting an estimate, of very doubtful accuracy, that American tourists spend a hundred million dollars abroad every year, he argues that the greater part of this sum goes to enrich the French, Italians and other possessors of beautiful cities and splendid museums, and that, if American cities were as beautiful as Paris, their inhabitants would stay at home, thereby saving their millions for the benefit of their own country. It would be instructive, if it were possible, to ascertain how the money of American tourists in Europe is generally spent, but it is safe to say that the millions that they leave in Paris are exchanged to a much greater extent for clothes and dress-materials than for works of art; and that if Paris had no Louvre, and no boulevards, and no Champs-Elysées, the number of Americans who would go there to buy cheap and pretty clothes, jewelry and fancy goods would not be much diminished. Mr. Adams speaks of England, discerning there signs of exhaustion from a two years' war with a few thousand wretched farmers, and contrasts it with France, which, after defeat in a terrible struggle with the most powerful nation in the world, and the payment of an enormous indemnity, is now the richest nation in Europe, and, as he says, has lent four hundred million dollars in London during the depression of the last year; but, although London has no boulevards, and no very charming public art, more American money is probably spent there than in all the other European cities put together. That a beautiful city like Paris, and, still more, kind and considerate manners, like those of the Parisians, attract visitors and customers, as they have been attracted to Paris for something like two thousand years, is certain; but whether New York can supplant Paris simply through the efforts of an Art Commission remains to be seen.

MR. ADAMS speaks of the Greeks in a cynical manner which will not please artists. According to him, the Greeks were, above all, men of business, carrying their commercial sagacity even into their art. Their temples, as he tells us, were, to a great extent, advertisements for their cities, standing, usually, on hills, where they could be seen to advantage, and built of dazzling white marble, made more brilliant, occasionally, by gilding and colors. Their construction, although costly at the outset, was, in the end, economical, for the trabeated structure needed little or no repair. "It was the most refined," Mr. Adams says, "the most effective and the cheapest form of advertising ever devised, and its success has been commensurate with its deserts. I venture to assert that no investment ever yielded such a large return through so long a period as that made by Pericles on the Acropolis." We think that there are other architectural investments which have yielded a much larger interest than those on the Acropolis, although not, perhaps, for so long a period; but, sagacious as Pericles probably was in business matters, it is hardly credible that he could have looked forward to the curiosity of American tourists for providing an income on his outlay, and the student of history will not forget that, within about thirty years after the completion of the Parthenon, the Athenians had been totally and repeatedly defeated on land and sea, their fleet utterly destroyed, their city entered in triumph by a

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

hostile army, and its fortifications demolished, as a consequence of a war brought on, to a great extent, by the resentment of the other Greeks at their ostentatious magnificence.

WE should be far from wishing to argue against the beautifying of cities, as well as of private habitations, and of the persons who live in them; but we have never yet seen a man or a woman, or a house or a city, adorned with the view solely of attracting attention, that seemed to us beautiful. On the contrary, beauty for the sake of beauty, not for the sake of advertising, is the only kind that has ever been found acceptable to the world, and it is as difficult to believe that Phidias and Ictinus built and carved for the sake of advertising themselves or any one else as it is to comprehend how Pericles should have foreseen a stream of rich tourists, coming to visit the ruins of his temples after they had been devastated by twenty-two centuries of war and neglect. Mr. Adams thinks that the business-like Greeks troubled themselves very little about the inhabitants of their temples, but he does not explain why, in this case, the Athenians should have made their goddess of gold and ivory, instead of painted wood, which would have been much cheaper, and, as the statue was not visible from a distance, equally valuable for advertising purposes. Moreover, if, as he says, "the Greeks were never emotional at a loss," why should one of their most beautiful temples have been put on the uninhabited cliffs of Sunium, where the sailors could see it as they left home, and on their return, but where it was useless for advertising purposes? It is certain that the worship of the ancient gods had lost much of its sincerity at the time when the most splendid temples were raised to them, but it does not follow that these temples were mere pretences, intended only as an excuse for architectural display; and those who are trying to do something to cultivate beauty, and the contentment and happiness which beauty can give, in our domestic and public life, will do best to dismiss at once the idea of advertising, or of attracting tourists, and devote themselves to the only source from which art has ever sprung, the expression in permanent materials of some emotion. The emotions so expressed may vary almost infinitely, from the affectionate cherishing of the memory of friends which fills France with beautiful monuments to the dead, or the feeling of power and responsibility which inspires the Florentine or Genoese palaces, to the unquestioning faith in immortality and angelic guardianship which gives the modern religious art of Russia its singular charm; but without sentiment of some kind there can be no art. With us, the difficulty has been that, instead of expressing our own sentiments, we have copied other people's expression of sentiments with which we have little or no sympathy. No modern, for instance, can enter fully into the passion for the human form, and, perhaps, into the appreciation of the subtleties of outline of which the human form presents the highest example, which were familiar to the Greek, surrounded from infancy with semi-naked people, trained to the most perfect physical development; and modern sculpture of the nude lacks, in consequence, the antique grace. On the other hand, the Greeks, whose sympathies were not cultivated by a religion of love and self-sacrifice, were incapable, probably, of understanding, much more of producing, the marvels of heavenly expression which we find in the works of the early Italian painters, accompanied with very incorrect drawing of the outlines of the body, which the artists regarded as a thing to be despised and kept in subjection. We, perhaps, are as far, at present, from being able to rival the spirituality of Ghirlandajo and Fra Angelico as the purity and elegance of the antique; but there are plenty of characteristic American sentiments which no one else has tried to express, and which we can express better than any one else, if we will only try. No people have a quicker appreciation of truth to nature than the Americans, or are freer from conventional prejudices, and the artist who renders his subject faithfully, in painting or sculpture, is sure of his reward here. Then, for an artist sufficiently developed to see the beauty of his subject, as well as to represent it truthfully, we have the most beautiful models in the world. Nowhere can there be found such variety of unaffected grace in outline and movement, such ease and sincerity, as among our children and young girls; and, for the greatest artists of all, who can perceive and represent what goes on in the hearts of their subjects, we have still left much of the unselfishness and noble aspiration on which the Republic was founded. Any one, therefore, who feels himself capable of adding to the artistic treasures of his country, not as a means of advertising it or himself, but for the sake of representing to others the American traits which he best appreciates, has a wide choice of fields; and if he succeeds in any, he may be sure that his countrymen will not be ungrateful.

THE Boston Museum of Fine-Arts has received, and is arranging in place, a large collection of Classical antiquities, purchased with the aid of friends of the Museum, and including a great number of Greek terra-cottas, with bronzes, marbles and jewelry, and about a hundred Greek vases. Naturally, the task of arranging such a collection is a long one, and it is not impossible that it will not receive its final form until it is placed in the new galleries to be built on the Fenway; but in the meantime, it will be all the more accessible to the multitudes who will wish to see it.

THE Municipal Art League of New York proposes to set up an artistic electric-light standard on one of the "islands" which, following the example of London, are to be established in the middle of crowded streets, to divide the traffic. Apart from the artistic decoration of these islands, they will be of great advantage to the foot-passengers in the crowded streets of New York, and, in a straight street, even if it is comparatively narrow, they form much less of an obstruction than might be supposed. We can very well remember London when there was nothing of the kind there, and to cross Piccadilly, between Regent Street and Bond Street, in the middle of the day, was an undertaking which required time and circumspection, and was very dangerous for children or infirm people. Now, although Piccadilly is no wider than it was then, and is even more crowded, there is no difficulty in crossing it anywhere, and at any time, by taking advantage of the "islands" which are scattered at short intervals through the middle of it, and which not only afford a refuge for the nervous pedestrian half way across the street, but, what is still more important, divide the stream of vehicles, so that the traveller has only to look in one direction for approaching danger, this direction being reversed on each side of the island. What could be done with the surface tracks in Broadway, if islands were put in the middle of the street, we will not undertake to say; but Fifth Avenue, at least, could be furnished with them, and an artistic standard for electric lights in the middle of each might be made to contribute materially to the attraction of the Avenue.

THE newspapers give the interesting piece of information that the members of the Imperial Court of China, feeling, no doubt in view of their recent calamities, the need of being more assiduous in worshipping at the tombs of their ancestors, have resolved to try to raise funds to build a railroad from Pekin to the site of their ancestral tombs, so that, whenever they feel an impulse to commune with the spirits of their fathers, they can take the first train, returning to their duties without unnecessary loss of time. What the spirits of the deceased will say to having the inventions of the "foreign devils" shrieking over their graves is, perhaps, unimportant, in view of the edifying piety of their descendants. A little study of the geography of the affair makes it, however, still more edifying. The ancestors of the reigning house of China were, as every one knows, Mantchu Tartars, and dwelt at Moukden, in Mantchuria, where their graves still remain. Now Moukden is in, or near, the province which Russia practically controls, and not very far from the line of the great Siberian Railway. It is obvious that the Russian railway managers would be glad of a line connecting their road with the great city of Pekin, but what seems to Americans the absurd jealousy of the other Powers would undoubtedly prevent Russia from building any railways in China, outside of Mantchuria; so that the sudden sentimentalism of the Imperial Court comes just at the right moment for providing the desired connection between Pekin and Moukden, without any interference on the part of the Russians. It is evident that the Powers cannot prevent the Chinese from building a railway within their own undisputed territory, for a peaceful and laudable purpose; and if the Russians should be so pleased with this beautiful example of filial affection as to help along the enterprise by advances of money, it is difficult to see how any one can complain. Meanwhile, when Pekin and Moukden are once joined by a railway, it will be very natural for the Chinese to ask the favor of a connection with the Siberian line, and the road from St. Petersburg to Pekin will then be complete.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — IV.

HAVING observed the properties of various sections, which included the section modulus, and having also determined the various formulas for calculating the bending-moment in beams, it is now in sequence to note the application of these several principles.

In order that a beam shall be sufficiently strong to carry the load, the external moments about any point in the beam must be equal to the internal moments. The external moment, as previously explained, is called the "bending-moment," while the internal moment is termed the "resisting-moment"; in this exists the equation $M = M_1$, where M equals the bending-moment and M_1 equals the resisting-moment. The resisting-moment of any beam-section is obtained by multiplying the section modulus of the section by the allowable unit stress, or, as it may be designated, $M_1 = Q\,S$, in which Q equals the section modulus, and S the allowable unit fibre-stress. It is usual

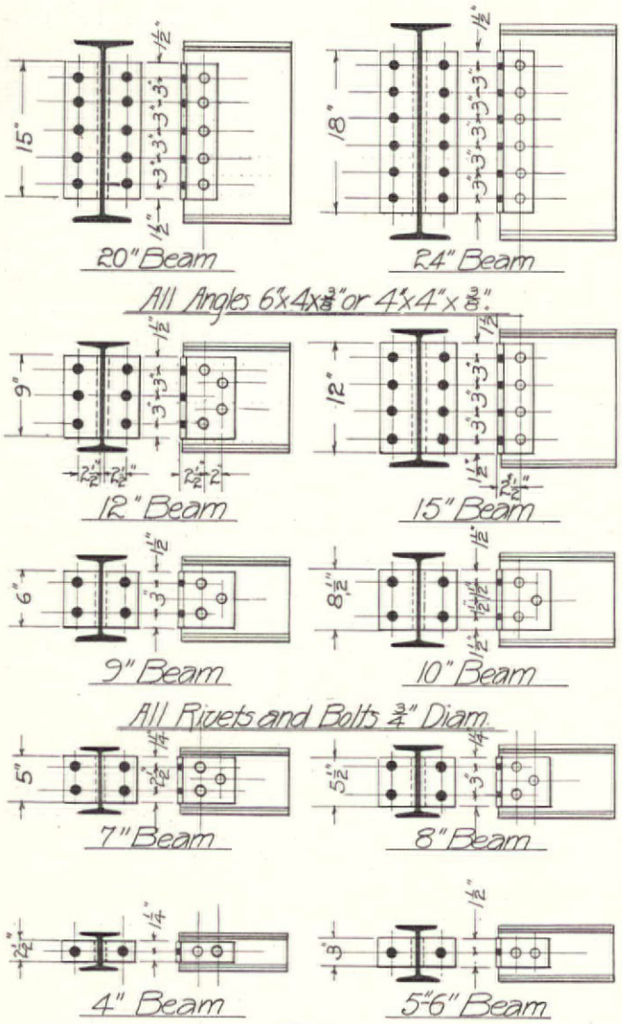


Fig. 20.

in calculating the strength of floor-beams and girders to have first calculated the bending-moment, or M, and to have assumed the allowable unit fibre-stress. From these it is common to figure the section modulus required in the beam section. This is readily done by transforming the former equation to $Q = \frac{M}{S}$; having obtained the value Q, all that is necessary is to refer to any of the tables published by the rolling-mills, and to select therefrom the most economical section that will fill the requirements. Where limiting conditions, such as head-room, or fireproof construction, do not exist, the deepest beam having the least weight and the required section modulus should be adopted.

Example. — A beam having a span of 20 feet supports a uniformly distributed load of 20,000 pounds. Assuming that the safe unit fibre-stress is 18,000 pounds, determine the most economical beam.

Solution: —

$$M = \frac{W\,L}{8}, \text{ or } \frac{20{,}000 \times 20 \times 12}{8} = 600{,}000 \text{ inch-pounds};$$

then Q equals $\frac{M}{S}$, or $600{,}000 \times 18{,}000 = 33\frac{1}{3}$, which is the value required for the section modulus. From almost any steel-mill's hand-book, under the table giving properties of I-beams, it will be noted in the column headed "Section Modulus," that there are two beams that may conveniently be used; one is a 10-inch beam having a section modulus of 35.7, and the other is a 12-inch beam having a section modulus of 36.7; it is evident, however, since the 12-inch beam weighs only $31\frac{1}{2}$ pounds as compared with the 10-inch beam, which weighs 40 pounds, that the 12-inch beam is far preferable — in fact, there is a saving of 25% in weight, and an increase of approximately 3% in strength. Besides, there is much gained in stiffness.

It is the usual practice in steel construction to use an allowable unit fibre-stress of from 15,000 to 20,000 pounds. The usual practice for medium steel, where the beams are subjected to a statical load, is to use an allowable unit fibre-stress of from 15,000 to 16,000 pounds, while if moving loads are apt to occur, or the beams likely to be subjected to sudden stress or shocks, 12,000 pounds per square inch is considered conservative.

In calculating the bending and resisting moments of beams, and equating M with M_1, the bending-moment must always be obtained in inch-pounds, for the result found by multiplying the section modulus by the safe unit fibre-stress gives the resistance of the beams in inch-pounds.

In selecting I-beams for floor-systems, it is the practice never to use a beam less in depth than one twenty-fourth of the span, or never of less depth in inches than one-half the span in feet. By following this rule excessive deflection is avoided, and the deflection that occurs is not sufficient, when the ordinary allowable unit fibre-stresses are used, to produce plaster cracks.

Where head-room is an object, or where architectural considerations prevent the use of beams fulfilling these conditions, the beams must be calculated for a low unit fibre-stress, and the deflection determined by the following table: —

FORMULAS FOR DETERMINING THE MAXIMUM DEFLECTION FOR BEAMS OF UNIFORM SECTION.

Method of Loading.	Deflection in inches.
Fixed at one end, concentrated load at the other.	$\frac{W\,l^3}{3\,E\,I}$
Supported at both ends, concentrated load at centre.	$\frac{W\,l^3}{48\,E\,I}$
Fixed at one end, uniformly loaded.	$\frac{W\,l^3}{8\,E\,I}$
Supported at both ends, uniformly loaded.	$\frac{5\,W\,l^3}{384\,E\,I}$
Fixed at one end and loaded with a right triangular load, the apex at the support.	$\frac{W\,l^3}{15\,E\,I}$
Supported at both ends, loaded with a triangular load apex at the centre.	$\frac{W\,l^3}{60\,E\,I}$

W = load in pounds; l = length in inches; E = 29,000,000; I = moment-of-inertia.

If the deflection found by calculation exceeds one thirty-second of an inch for each foot of span, or one three-hundred-and-sixtieth part of the span, a beam of heavier section should be employed, and thus a lower unit fibre-stress obtained.

In laying out the floor-plan for a building of the skeleton-construction type, all that is necessary is a mere diagrammatic drawing showing the location of the columns and the centre lines of the principal beams and girders, together with the sizes that have been calculated to meet the requirements of the particular case. The connection of the various beams one with the other, and to the girders, and the connection of the girders to the column require careful study. The beams must be so secured to the girders that the connection will carry the maximum reaction at their ends. The connections are made up of two angle-iron clips, which are held to the web of the beam by bolts, and which in turn hold the beam in place to the web of the girder by similar bolts. These connections are so frequently used that they have been standardized by the several steel-mills, as shown in Figure 20. Since the transverse strength of a beam depends directly upon its span, it is evident that standard connections can only be used where the girders have the usual span, and any standard connections which might be adopted are only

[1] Continued from No. 1363, page 45.

secure when the spans of the beams exceed the minimum. The following table, which may be found in almost all of the steel-mill hand-books, gives the minimum spans for which standard

THE MINIMUM SPAN FOR I-BEAMS WHEN STANDARD CONNECTIONS ARE USED.

Size of beam.		Minimum span.	Size of beam.		Minimum span.
Depth.	Weight.	Feet.	Depth.	Weight.	Feet.
20	90	20.5	9	27	10.5
20	80	18.0	9	23½	7.5
20	75	16.5	9	21	9.0
20	65	18.0	8	27	6.0
15	75	16.0	8	22	9.0
15	66⅔	15.0	8	18	7.5
15	60	16.0	7	20	7.0
15	50	15.5	7	15	6.5
15	42	14.0	6	16	7.0
12	55	13 5	6	13	6.5
12	40	12.0	5	13	5.0
12	31½	10.5	5	9¾	4.5
10	40	12.0	4	10	2.5
10	33	11.5	4	8	2.5
10	30	9.0	4	6	2.5

connections can be used. In designing the standard connections an allowable unit shearing-stress of 9,000 pounds was used, while an allowable unit bearing-stress of 18,000 pounds was employed, both values being required in figuring the strength of the bolts in resisting shear, and the bearing of the metal around the bolt-holes in resisting crippling. Where the beam is of a span shorter than the minimum, a special connection must be designed. This can readily be accomplished by calculating the greatest reaction and providing enough bolts to resist the stress.

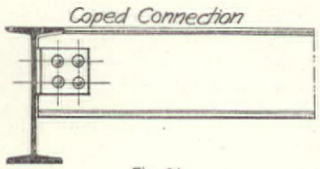


Fig. 21.

Sometimes the connecting-angles are riveted to the beams. In framing I-beams to girders the top flange of the beam may be either flush with the flange of the girder, or dropped below the fillet connecting the flange and web of the girder. The latter practice is usual, as it saves coping the beam as designated in Figure 21. The expense of cutting away the upper flange of the beam to fit the flange of the girder adds considerably to the cost of the work, and this method of framing is only employed where architectural considerations require that the beam shall be flush upon the upper flanges. It is the practice in the erection of the work in the field — that is, the assembling of the beams making up the floor-system, for the erector to place the beams in position, putting one or two bolts in a connection and proceeding over the entire work in this manner, going over each connection finally, and putting in all the bolts. In order that this work may be done properly requires rigid inspection, for many bolts are left out entirely, and the majority of those in place are seldom bolted tight. The inspector in going over this work should mark each connection that is improperly bolted with a chisel, chalk and paint being inadequate, as unscrupulous workmen are liable to erase such marks rather than bolt the connection properly.

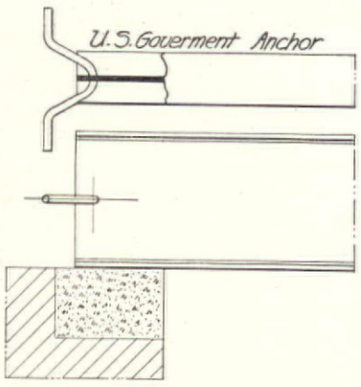


Fig. 22.

The tail-end of each steel floor-beam, that is, the end which has its bearing upon the wall, should be securely anchored into the wall, and each beam should have a sufficient bearing upon the masonry. The common form of anchor used for the tail-end of beams is what is known as the United States Government anchor, which consists of a piece of ¾-inch round iron, bent to the form shown in Figure 22. This anchor is placed through the end of the web of the I-beam, and is securely built into the stone or brickwork. Where two beams are placed opposite to each other on a partition-wall, they are sometimes anchored as shown in Figure 23 by means of a wrought-iron strap consisting of a piece of 2″ x ¼″ bar, punched on the ends, and bolted to the webs of each beam. The difficulty in the use of this system of anchorage upon a

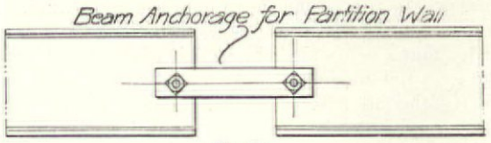


Fig. 23.

partition-wall lies in the fact that it is practically impossible to construct a building so accurately or to obtain the steelwork punched to such a nicety that the straps can be made in the shop — the hole in one end of them must necessarily be punched or drilled in the field. While this means of anchoring two systems of floor-beams bearing upon a partition-wall is excellent, the practical objections are difficult to overcome, and the Government anchor is usually resorted to.

Where the ends of steel beams rest upon a wall they should have from a 6-inch to 12-inch bearing, the usual bearings for the different sized beams being as follows: —

Under	6 inches	6-inch bearing.
Over 6 inches and under 8 inches		8-inch bearing.
Over 8 inches and under 12 inches		10-inch bearing.
Greater than	12 inches	12-inch bearing.

In any case the bearing of the steel beams upon the wall should not produce a greater stress per square inch of bearing-surface than is given by the following table: —

SAFE BEARING PER SQUARE INCH FOR BRICKWORK AND MASONRY.

Brickwork laid in cement-mortar	200 pounds.
Brickwork laid in lime and cement-mortar	150 pounds.
Brickwork laid in lime-mortar	100 pounds.
Concrete, of the best Portland-cement	150 pounds.
Rubble masonry in lime-mortar	80 pounds.
Rubble masonry in Portland-cement mortar	150 pounds.

The brickwork in the above table is assumed to be of first-class workmanship, well bonded, and of hard, well-formed burned brick. Where the bearing of the bottom flange is likely to produce a pressure greater than those given in the above tables, either steel bearing-plates or stone templates should be used upon the wall to distribute the pressure and in order to prevent crushing. When stone templates are used to distribute the pressure, they may be subjected to a bearing-pressure from the lower flange of the steel beams of at least 500 pounds per square inch, provided the thickness of the template is not less than 8 inches. Where bearing-plates of steel are used underneath the ends of the beams, the length and breadth of the plate should be determined from the safe bearing-pressure of the brickwork or masonry, and the thickness calculated by the following formula: —

$$t = .87\,(l - w)\sqrt{\frac{W}{S w_1 l}}$$

in which t equals the thickness of the plate in inches, l the length of the bearing-plate at right angles to the length of the beam, w equals the flange-width of the beam in inches; W equals the reaction at the point of support in pounds; S equals the allowable unit stress in the plate; w_1 equals the width of the plate, or the dimension parallel with the length of the beam — that is, the bearing on the wall in inches.

Example. — The end of a 20-inch girder of I-beam section, and having a flange-width of 6 inches, has a 12-inch bearing upon a wall built of good hard bricks laid in cement-mortar, the reaction at the end amounting to 25,000 pounds. It is required to determine the size and thickness of the bearing-plate.

Solution. — From the table given above it is ascertained that good brickwork in Portland-cement mortar will support 200 pounds per square inch; since the bearing-length of the plate will be 12 inches, the allowable load for each inch in the width of the plate will be 12×200, or 2,400 pounds; dividing 25,000 pounds by 2,400 pounds it is found that the width or length of the bearing-plate perpendicular to the axis of the girder is equal to $10\frac{1}{2}$ inches; the size of the plate has then been found to be $12'' \times 10\frac{1}{2}''$; and it is required to determine the thickness. Substituting in the formula, when S, or the safe allowable fibre-stress in the plate equals 16,000, it is found that

$$t = .87\,(10\tfrac{1}{2} - 6)\sqrt{\frac{25{,}000}{16{,}000 \times 12 \times 10.5}}$$

or .605, which is practically a $\frac{5}{8}$-inch plate. The following table gives the usual size and thickness of bearing-plates for the different sized beams and the safe pressure at the end of the beams in tons that they will carry: —

TABLE OF STANDARD BEARING-PLATES FOR I-BEAMS GIVING THE SAFE END-REACTION AT THE END OF THE BEAM IN TONS, WHEN THE SAFE-BEARING ON THE MASONRY EQUALS 100 POUNDS PER SQUARE INCH.

Size of beam.	Size of standard plates for templates.			Safe end-reaction.
	Length.	Width.	Thickness.	
20″	12″	16″	$\frac{3}{8}$″	9.6
15″	12″	12″	$\frac{3}{8}$″	7.2
12″	10″	10″	$\frac{3}{8}$″	5.0
10″	10″	8″	$\frac{3}{8}$″	4.0
8″	8″	8″	$\frac{3}{8}$″	3.2
6″	6″	8″	$\frac{3}{8}$″	2.4

The size of a stone template depends upon the allowable pressure on the brickwork. The template should never project in any direction beyond the bearing-plate or flange of the beam more than three-fourths of the thickness of the stone.

The steel beams forming the main support of a fireproof-floor system are tied together laterally by means of tie-rods. These tie-rods are from $\frac{5}{8}$ inch to $\frac{7}{8}$ inch in diameter, and are placed from 4 to 6 feet from centre to centre. There are several empirical rules for the spacing of these rods; one is, to make the distance from centre to centre of rods not greater than twenty times the flange-width; another, which is not so reasonable, that the distance between the rods should not be greater than eight times the depth of the beam. Since the lateral resistance of a beam does not depend upon the depth, to any extent, it would seem that the first rule is the most consistent. The tie-rods should be placed as nearly coincident with the centre of the thrust of the arch as possible, though where segmental arches are used, the tie-rods should not project below the crown of the arch; ordinarily they are placed below the centre-line of the beam, and often very close to the bottom flange. In any case the steel rods must come within the fireproofing material, otherwise they will be exposed to the heat of a possible conflagration, and the principal purpose of their instalment abrogated. Usually the thrusts of the arches in adjacent bays or panels counterbalance each other, and tie-rods are only really required in one panel to take the thrust of the end arch from the walls, or from the beam adjacent to the walls. They are, however, necessary to prevent lateral deflection of the beams in case of fire and during construction.

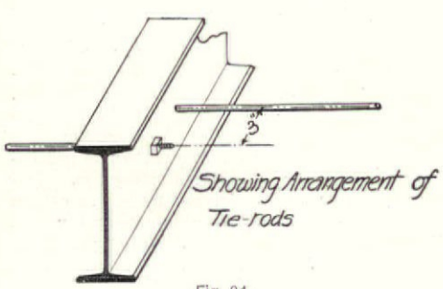


Fig. 24.

Since the tie-rods secure each beam to the other laterally, it is necessary to provide holes in the webs for the rod attached to the beam on the one side, and also for the rod attached to the beam on the other side. These holes should not be farther apart than 3 inches, as designated in Figure 24.

Where brick arches are used the horizontal thrust of the arch is readily found by the formula

$$p = \frac{1.5\ W L^2}{r}$$

in which p equals the thrust of the arch in pounds for each lineal foot, W equals the load in pounds per square foot of floor-surface; L equals the distance in feet between beams, or the span of the arch, and r equals the rise of the arch in inches. If the I-beam has a sufficient lateral resistance to bending to take up this thrust, no tie-rods need be used. The calculation for the thrusts may be applied in determining the distance apart of the tie-rods. A beam supported laterally by a number of tie-rods is semi-continuous, and the distance between the supports may be determined for I-beams and channels by the following formulas: —

$$L = \sqrt{\frac{C A w}{p}}$$

in which L equals the distance between tie-rods in feet; C is the constant, which for I-beams is 1,300, and for channels is 1,650; A is the sectional area of the beams in square inches; w the width of the flange in inches, and p is the lateral pressure in pounds per lineal foot of the arch.

Example. — A brick arch having a span of 4 feet, and a rise of 6 inches, is supported upon 12-inch I-beams having a sectional area of 16 square inches; provided the load upon the floor is 300 pounds per square foot, what distance apart should the tie-rods be spaced?

Solution. — The horizontal thrust of the brick arch per lineal foot, or p, equals $\frac{1.5 \times 300 \times 4 \times 4}{6}$, or 1,200 pounds. Then substituting in the formula $L = \sqrt{\frac{1{,}300\ A W}{p}}$, it becomes $L = \sqrt{\frac{1{,}300 \times 16 \times 6}{1{,}200}}$, or 10.2 feet, which is the desired result, or distance between centres of tie-rods.

It is sometimes necessary to proportion steel beams to withstand the effects of a suddenly applied load; such a condition often exists where the beams support the mechanism at the head of an elevator-shaft. It is considered by the best practice that a load suddenly applied produces a strain upon a beam or girder equal to twice the amount that the same load would produce if it were static. That is, a suddenly applied load should only be one-half as great as the safe statical load. Where the load falls some distance upon the beam the stress produced in the beam is very great, due to the impact, and the usual method employed to determine the resistance of the beam under such a severe condition is to equate the effect of the falling load to the effect of a statical load applied at the same position on the beam, and from these data determine the required section modulus. The formula used for determining the amount of the statical load that would produce the same effect as a certain falling load is as follows: —

$$W s = W\left(1 + \sqrt{\frac{2\,m\,h}{d}} + 1\right)$$

in which $W s$ equals the statical load that would produce an equivalent effect; W the falling load; h the height in inches through which the load falls; d the deflection of the beam, in inches, that would be produced by the load W if at rest, while m is obtained from the following formula: —

$$m = \frac{1}{1 + \frac{L}{2.06\,W}}$$

in which L equals the weight of the steel beam and the entire dead load which it carries.

It is often necessary in building-construction to use several I-beams side by side to carry a load so great that one beam would be insufficient. Such girders are especially used for lintels for supporting brickwork over openings. Where there are no openings above the girder, good brickwork arches itself, and the load upon the girder is triangular in shape, the altitude of the triangle being taken at one-third the span. Where two or more I-beams are used together and are subjected to the same load, they should be tied together at intervals of from 6 to 8 feet, and separators should always be provided at the ends of such girder, and also wherever a concentrated load is located. Where a girder composed of two I-beams is used in floor-construction, and the floor-beams are framed into it, care must be taken to see that the connections do not interfere with the separators, and, wherever possible, separators should be placed adjacent to the connections. It is customary in making such connections to bolt the angles attached to the beam on the one side to the web of the one beam, while the angles attached to the beam on the other side are bolted to the web of that beam, — that is, the bolts securing the connections to the girder do not extend through the girder. It is necessary, therefore, that a girder composed of two I-beams, and required to support the ends of floor-beams, should be shipped in pieces and put in place in the field.

M. M. Sloan.

[To be continued.]

A Tripolitan petrified Forest. — Describing his journey in the forbidden desert in the hinterland of Tripoli, Mr. Dodson, who has recently returned to England, says that one of the most notable things on the journey to Murzuk was the great petrified forest, which his party passed through. For ten hours they travelled across an area of petrified trees, varying in circumference from seven feet to a few inches. Every branch of this forest was, of course, lying prone, and this, together with the presence of marine shells, showed that this part of the Great Sahara had at one time been submerged. — *Exchange.*

OWNER'S RESPONSIBILITY FOR PAYMENT OF PROVISIONAL SUMS.

IN the Court of Appeal on the 17th inst. the appeal case Hobbs *vs.* Turner was heard. According to the report in the *Times*, the plaintiff, who was a metalworker, sued the defendant, a building-owner, for £27 10*s.*, for metalwork supplied for a house which the defendant was having built for him by a builder under the supervision of Mr. J. L. Williams as architect. The contract under which the house was being built was made in September, 1898, and was in the form settled and issued by the Royal Institute of British Architects. By the contract the builder, in consideration of a sum of £4,700, agreed, upon and subject to the conditions in the schedule to the contract, to execute and complete the works described in the specification. Payment for the work was to be made by instalments as the work progressed, according to the certificate of the architect. Clause 28 of the contract, so far as material, was as follows: "The provisional sums mentioned in the specification for materials to be supplied or for work to be performed by special artists or tradesmen, or for other works or fittings to the building, shall be paid and expended at such times and in such amounts and to and in favor of such persons as the architect shall direct, and sums so expended shall be payable by the contractor without discount or deduction or . . . by the employer to the said artists or tradesmen. The value of works which are executed by the contractor in respect of provisional sums, or in additional works, shall be ascertained as provided by Clause 13. At the settlement of the accounts the amount paid by the contractor to the said artists or tradesmen, and the said value of such works executed by the contractor, shall be set against all such provisional sums or any sum provided for additional works, and the balance shall be added to or deducted from the contract sum."

The specification contained this clause: "Provide and fix iron balcony-railings to design (allow £20 for this, irrespective of carriage, fixing and profit)." It was not suggested that there was anything in the specification to alter the legal rights of the parties. The architect selected the plaintiff as the person to supply the ironwork for the balconies, and the builder asked the plaintiff to send designs to the architect, who rejected them, and sent the plaintiff his own designs; and the builder having given measurements and quantities, the ironwork was sent to him (the builder) and the goods were invoiced and debited to him. Later on, in November, 1899, the builder wrote to the plaintiff asking him to send him his account, and he did so; but on December 9 the builder wrote saying that the architect would certify the amount direct to the building-owner (the defendant), and on December 14, 1899, the architect sent to the plaintiff a certificate addressed to the defendant certifying that the plaintiff was entitled to be paid £27 10*s.* for the ironwork. This certificate the plaintiff sent to the defendant, who kept it, making no reply. After this the plaintiff sent two or three times to the defendant for the money, of which the defendant took no notice. In October, 1900, when the plaintiff's solicitor wrote for payment, the defendant repudiated liability. The defendant alleged that he had a claim against the builder for bad work. Mr. Justice Kennedy gave judgment in favor of the plaintiff. The defendant appealed.

The Court dismissed the appeal.

The Master of the Rolls said that, in his opinion, the appeal should be dismissed. The contract was one which was not an unusual one at the present time, namely, the builder undertook to do certain portions of the work, and as to the other portions of the work provisional sums were specified. The specification contained this clause: "Provide and fix iron balcony-railings to design (allow £20 for this, irrespective of carriage, fixing and profit)." That threw them back upon the original central undertaking of the builder contained in the contract and the conditions. In consideration of the sum of £4,700 the builder agreed to execute and complete, subject to the conditions in the schedule to the contract, the works described in the specification. In the conditions and specification they found how that lump sum was to be distributed. They found that the builder was not necessarily to execute the whole of the work, but the building-owner might get other persons to do certain parts of the work, and as against the builder certain fixed sums only were to be paid out of the lump sum to those persons for that particular class of work. It was good sense that a sum should be fixed for each class of work which was not to be executed by the builder, but by some tradesman or artist designated by the architect. The building-owner — the defendant — had a discretion as to the person by whom this class of work was to be done, and he might agree to pay him any sum he pleased, but he could only allow as against the builder the fixed sum for each class of work. That being so, Clause 28 of the conditions seemed to him to contemplate payment for this class of work being made either by the builder or by the building-owner, and the last part was based on the hypothesis that part of the work might be done by the builder and part not done by him, and where any such work was not done by the builder the building-owner would be entitled to hold back the amount specified for that work. This clause was obviously framed upon the footing that the building-owner was liable for this particular class of work. In his opinion, when one looked at the whole of the contract taken together, and not relying upon any one particular clause, the proper inference as regarded this particular class of work was that it was intended that the building-owner, and not the builder, should be the principal. If the builder entered into a contract for any of this class of work he might make himself liable to the tradesman or artist; but, as he was acting under the general scope of the contract, he would be acting as the agent of the building-owner and would create privity of contract between the building-owner and the tradesman or artist. That could only be got rid of by the tradesman or artist contracting with the builder in such a way as to debar himself from resorting to the building-owner. Nothing of that kind occurred here. What happened was that the plaintiff was put into relation with the defendant through the architect, and, though this was not clear, he understood that the order was given to the plaintiff by the architect. It was true that the invoice was sent to the builder, but the architect gave a certificate against the defendant, and not against the builder, and sent it to the defendant. His lordship did not intend to say anything about the point as to estoppel, nor was it necessary to decide whether, under Clause 28 of the conditions, the architect had authority to determine who was to pay as well as to whom payment should be made. It seemed to him, looking at the contract as a whole, that the initial liability of the defendant — the building-owner — in respect of this class of work was established, and that all the parties dealt upon that footing. The judgment was, therefore, right.

Lord Justice Romer agreed.

Lord Justice Mathew was of the same opinion. This was a question of fact which had been properly decided by the learned judge. — *The Architect.*

BOOKS AND PAPERS.

IF the English-speaking race remains ignorant upon art, it cannot be the fault of the publishers of books, nor of the dealers in pictures. Book succeeds book, just as exhibition succeeds exhibition: They come, they come, *immer, immer mehr*, and at prices ranging from 10 guineas to 12 pence. Does this work for good as regards the culture of the people? Can a shilling book compass enough information to be of any real value, when we consider that it contains no less than eight illustrations, is well printed on good paper and neatly bound in cloth? This question may be answered by a short review of these "miniature books"[1] upon painters.

Of course, the possibility of publishing these and even the more expensive "*Great Masters*" series at 5*s.* or 7*s.* 6*d.* must depend upon the fact that the authors of the voluminous 5 or 10 guinea books are willing to condense their works, and boil them down to 50 or 60 pages of a post 8vo volume. Also as a passport to efficient work, we have Mr. Williamson as an editor to the series. Naturally, some of the books are better than others, and Mr. Williamson's "*Fra Angelico*" leaves little to be desired as a handbook to San Marco, or as a simple book of reference. Of course it is not sufficient for the student, but the author gives a list of books upon the subject which will enable him to learn more. There is also a list of Fra Angelico's principal pictures scattered over Europe, and a very useful chronological table of the principal pictures of the painter's working years. These added to a clearly-written and concise history of the master's life is not a bad shilling's worth, and must, we think, work for good as regards culture, just as "penny poets" help the laboring population to a little enjoyment in a more or less uninteresting life. The present writer has seen a penny "*Shelley*" lying by the side of a carpet-factory girl to entertain her during the dinner hour. "Yes, she did love Shelley," she replied to a question. What matters it whether she understood him or not? The music helped her through many a dull hour, as it does the rest of us.

Mr. Williamson criticises Fra Angelico's art as well as his religion. He used art "as a means of imparting religious instruction," and thus gave it "its greatest dignity." He also "employed the talents which God had given him" to "their best advantage." "He knew that to be a saint was more in the eyes of God than to be an artist," and so, "the unity between these two phases of character was not impossible, as some persons have thought." Possibly, many a modern painter has felt this, and used as much fervor and prayer during his work as the great Dominican, only in a less obvious manner. Mr. Williamson suggests that the great "Crucifixion" at San Marco refutes the opinion that the painter ignored the study of the nude. On the contrary, he argues, Fra Angelico painted all that he touched with exquisite truth — flowers, dancing-figures, expressions of feeling as depicted upon the human face, little vistas of landscape — all was handled with loving care and exquisite sentiment. Perhaps the best example of the harmony of the Saint and the Painter may be seen in the dainty and exquisite dance of the angels in the "Last Judgment" in the Accademia at Florence.

In Mr. Staley's "*Watteau*," much remains to be desired, and notably, correction of French quotations and words. "Gave upon the market-place" is scarcely classic English; and the following may be cited as curious blunders due to the careless correction of proofs, or the printer. Audran living "during the old age of Louis IV." The "*Chateaux de Merdon*," for "*Chateau de Merdun*"; "*Le défait de Goltath*"; "*Abigail que apport les vivres*"; "*Ils n'ont pas l'air decroire à leur bonheur*"; and last, not least, the frequent use of

[1] "*Fra Angelico*," by George C. Williamson; "*Watteau*," by Edgecumbe Staley; "*Romney*," by Rowley Cleeve. Bell's Miniature Series of Painters. 1*s.* London. 1901. "*The Art of Illustration*," by H. Blackburn, revised by J. S. Eland. New Edition, 98 Illustrations, with a chapter upon Colored Illustration. John Grant, Edinburgh.

"*coiffeur*" for *coiffure*. The ladies wore *coiffeurs* on their heads! and we are told of the "beautiful *coiffeurs*" of the period! Why, too, need the author speak of "details of *mode* and texture," and "interesting *toilettes*"; language which he borrows from the drapers' and dressmakers' lists.

In spite of these blemishes, and a certain want of sympathy for Watteau, the book is a pretty little volume well illustrated, indeed the illustrations are the best part of the work; for although but small, 3″ x 4″, they give a very fair idea of the grace and elegance of the painter's compositions; they remind one of much of the printed Worcester, the makers of which reproduced many of Watteau's engravings on their china. Among the list of chief books upon Watteau the author gives Walter Pater's "*Imaginary Portraits*";[1] but Mr. Staley has not imbibed the poetic and sympathetic tone of the Oxford Don's charming sketch of Watteau and his pupil, Jean Baptiste Pater.

The Romney volume also contains some pretty illustrations, but the letterpress consists chiefly of the life of Lady Hamilton. This is written with much more detail than is usual or necessary, with the result that the volume cannot be given to the young; and why we need know the details of the lady's love affairs in order to account for the fascination of her face seems quite unnecessary.

Mr. Cleeve considers Romney a better draughtsman than either Reynolds or Gainsborough, but as colorists he places the latter first of the three — indeed with our author, the President fares badly, and quite takes a back seat. No doubt there is great charm in the coloring of Gainsborough, but it has not the pureness of tone of a good Reynolds; and when we consider his work from the point-of-view of strength, he does not approach Reynolds. Romney, too, was a fine colorist; his handling of a white muslin gown is unrivalled, but we surely should find no difficulty in putting Reynolds as the first of British painters if we saw his best portraits and the best of Gainsborough's and Romney's side by side with those of Rubens, Velasquez and Rembrandt. The President would stand the strain; but it is more than doubtful whether the work of his rivals would, even at their best. The chief beauty of Romney's work is its directness; its bad qualities are thinness of tone, and sometimes an effect of careless hurry. But there is no doubt that there is a marvellous charm about the mere *technique* of such a work as "Mrs. Mark Currie" (National Gallery, London), and Romney was more fortunate than his rivals in the fashions, which had become simpler, more easy, and, above all, the hair was dressed far more becomingly.

The new edition of Mr. Blackburn's book is brought up to date, and for those engaged in drawing for the press is invaluable, both in its "hints" and instructions, and for its illustrations. It describes all the modern processes, and gives examples of reproductions of most of them. It is well printed, and, barring its weight, which is inevitable, is altogether a charming as well as a most useful book for draughtsmen.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

SECTION, PLAN AND ELEVATION: UNITED STATES POST-OFFICE AND COURT-HOUSE, ELMIRA, N. Y. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

STAIRCASE DETAIL IN THE SAME BUILDING.

DETAIL OF FRONT ENTRANCE TO THE SAME BUILDING.

HOUSE OF D. E. NORTON, ESQ., EUCLID AVE., CLEVELAND, O. MR. CHARLES F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

[The following named illustration may be found by reference to our advertising pages.]

HOUSE ON THE AVENUE MALAKOFF, PARIS, FRANCE. M. LE VOISVENEL, ARCHITECT; — HOUSE ON THE RUE DE LA CONVENTION, PARIS, FRANCE. M. LEGRIEL, ARCHITECT.

THIS plate is copied from *La Construction Moderne*.

[Additional illustrations in the International Edition.]

DINING-ROOM: HOTEL MANHATTAN, NEW YORK, N. Y. MR. H. J. HARDENBERGH, ARCHITECT, NEW YORK, N. Y.

INTERIOR DOOR: HOTEL MANHATTAN, NEW YORK, N. Y.

STREET FRONTS, BRUSSELS, BELGIUM: TWO PLATES.

THESE plates, reproduced from *L'Emulation*, afford an admirable warning against restlessness in design.

[1] See *American Architect*, September 10, 1887.

NOTES & CLIPPINGS

ANDREW CARNEGIE'S GIFTS. — The *N. Y. Times* makes the following tabulation of Mr. Carnegie's public benefactions: Carnegie, Andrew, New York, gifts for a technical school at Pittsburgh, Pa., $2,000,000, with promised endowment of at least $25,000,000; to the Government of the United States, to establish in Washington a university for higher education, $10,000,000; to the Carnegie Institute, Pittsburgh, $1,000,000; to Cooper Union, New York, $300,000; Upper Iowa University, Fayette, Iowa, $225,000; to Bellevue Medical College, New York, $76,000; to Carnegie Laboratory, New York, $50,000; to Aurora (Ill.) College, $50,000; New York Educational Alliance, $2,500. Besides these gifts by Mr. Carnegie there remain his gifts to public libraries. In the *Library Journal* for January of this year is given a table of such gifts which shows the immense total of $13,813,000. This sum was distributed among 153 places in thirty-three States, Porto Rico, Canada, and British Columbia, the largest individual items being $5,000,000 for branch libraries in New York City, $1,000,000 to St. Louis for the same purpose, and a like sum for the endowment of the Carnegie libraries of Bradford, Duquesne, and Homestead, in Pennsylvania. The record is as follows: —

Aberdeen, S. D.	$15,000	Macon, Ga.	$20,000
Akron, Ohio	70,000	Madison, Ind.	20,000
Alameda, Cal.	35,000	Madison, Wis.	75,000
Atlanta, Ga. (additional)	20,000	Mankato, Minn.	40,000
Aurora, Ill.	50,000	Marion, Ind.	50,000
Austin, Minn.	12,000	Mattoon, Ill.	20,000
Beloit, Wis.	25,000	Miles City, Mon.	10,000
Bloomington, Ill.	15,000	Moline, Ill.	37,000
Braddock, Duquesne, and Homestead Carnegie Libraries, Pa.	1,000,000	Montclair, N. J.	30,000
		Montgomery, Ala.	50,000
Burlington, Vt.	50,000	Montreal, Can.	150,000
Canandaigua, N. Y.	10,000	Mount Vernon, N. Y.	35,000
Cañon City, Col.	10,000	Muncie, Ind.	50,000
Canton, N. Y.	30,000	Nashville, Tenn.	100,000
Canton, Ohio	50,000	Neenah, Wis.	10,000
Carbondale, Pa.	25,000	New Rochelle, N. Y.	25,000
Carrollton, Ill.	10,000	New York City	5,000,000
Catskill, N. Y.	20,000	New York Press Club	5,000
Charleston, Ill.	18,000	Niagara Falls, N. Y.	50,000
Cedar Rapids, Ia.	75,000	Norristown, Pa.	50,000
Centralia, Ill.	15,000	Norfolk, Va.	50,000
Charlotte, N. C.	25,000	Norwalk, Conn.	20,000
Charlottesville, W. Va.	20,000	Nyack, N. Y.	15,000
Chatham, N. Y.	15,000	Oneida, N. Y.	11,000
Clinton, Ia.	30,000	Ottawa, Can.	100,000
Clinton, Mass.	25,000	Oyster Bay, N. Y.	1,000
Cohoes, N. Y.	25,000	Paducah, Ky.	35,000
Collingwood, Ontario, Can.	10,000	Pekin, Ill. (additional)	5,000
Conneaut, Ohio	100,000	Pembroke, Ontario, Can.	10,000
Cornell College, Ia.	40,000	Pensacola, Fla.	15,000
Covington, Ky. (additional)	35,000	Perth Amboy, N. J.	20,000
Crawfordsville, Md.	25,000	Peru, Ind.	25,000
Cumberland, Md.	25,000	Phœnixville, Pa.	20,000
Danville, Ill.	40,000	Port Jarvis, N. Y.	30,000
Davenport, Ia.	25,000	Portland, Ind.	15,000
Decatur, Ill.	60,000	Portsmouth, Ohio	50,000
Detroit, Mich.	750,000	Revere, Mass.	20,000
Elkhart, Ind.	35,000	Racine, Wis.	50,000
Elkwood, Ind.	25,000	Redwing, Minn.	15,000
Fargo, N. D.	20,000	Richmond, Va.	100,000
Fort Scott, Kan.	15,000	Riverside, Cal.	20,000
Fort Wayne, Ind.	75,000	Rockford, Ill.	60,000
Freeport, Ill.	30,000	St. Cloud, Minn.	25,000
Fresno, Cal.	30,000	St. Johns, N. F.	50,000
Galesburg, Ill.	50,000	St. Joseph, Mo.	25,000
Gloversville, N. Y.	25,000	St. Louis, Mo.	1,000,000
Goshen, Ind.	25,000	San Francisco, Cal.	750,000
Grand Junction, Col.	3,000	San José, Cal.	50,000
Great Falls, Mon.	30,000	San Juan, P. R.	100,000
Green Bay, Wis.	25,000	Sault Ste. Marie, Mich.	30,000
Greenville, Ohio	25,000	Schenectady, N. Y.	50,000
Griffin's Corners, N. Y.	5,000	Seaboard Air Line (travelling libraries).	1,000
Grossdale, Ill.	35,000	Seattle, Wash.	200,000
Guthrie, O. T.	20,000	Sharon, Pa.	25,000
Hawarden, Ia.	5,000	Sheboygan, Wis.	25,000
Hempstead, N. Y.	25,000	Sioux Falls, S. D.	25,000
Henderson, Ky.	25,000	South Omaha, Neb.	60,000
Iron Mountain, Mich.	17,500	Springfield, Ill.	75,000
Ishpeming, Mich.	20,000	Staten Island (N. Y.) Academy	500
Islip, N. Y.	10,000	Stillwater, Minn.	25,000
Jackson, Mich.	70,000	Stratford, Manitoba, Can.	12,000
Jackson, Tenn.	30,000	Superior, Wis.	50,000
Jacksonville, Ill.	40,000	Syracuse, N. Y.	260,000
Janesville, Wis.	30,000	Tacoma, Wash.	50,000
Johnstown, N. Y.	20,000	Upper Iowa University, Ia.	25,000
Joplin, Mo.	40,000	Valley City, N. D.	15,000
Kalispell, Mon.	10,000	Vancouver, B. C.	50,000
Kansas City, Mo.	75,000	Wabash, Ind.	20,000
Kent, Ohio	10,000	Walpole, Mass.	15,000
Lewanee, Ill.	50,000	Washington, Ind.	20,000
Lake Charles, Ia.	10,000	Waukegan, Ill.	25,000
Lawrence, Kan.	25,000	Wheeling, W. Va.	75,000
Leadville, Col.	100,000	Windsor, Ontaria, Can.	20,000
Lewiston, Me.	50,000	Winnepeg, Manitoba, Can.	100,000
Lincoln, Ill.	25,000	Yonkers, N. Y.	50,000
Los Gatos, Cal.	10,000		
McKee's Rocks, Pa.	20,000	Total	$13,813,000

In addition, Mr. Carnegie's gifts for library purposes in Great Britain are recorded as reaching a total of £179,500, or over $800,000. These were distributed to eight places, of which all but one were in Scotland, the record being as follows: —

Annan, Dumfriesshire, Scotland.	£3,000	Glasgow, Scotland.	£105,000
Coabridge, Lanark, Scotland	15,000	Larbert, Stirling, Scotland.	3,000
Dalkeith, Scotland.	4,000	Rutherglen, Lanark, Scotland.	7,500
Dundee, Scotland.	37,000	Waterford, Ireland.	5,000
		Total	£179,500

ALUMINO-THERMIC WELDING. — By a new modification of the Goldschmidt process of alumino-thermic welding and casting, skilled labor is

not necessary, and an ordinary workman can easily effect a good weld. The time is also shortened. The "thermit" mixture (of which one kilogramme yields 450 grammes of molten iron) is placed in a crucible made of iron plate lined with refractory material, mounted on a substantial tripod and closed at the bottom with one or more small iron plates, according to the quantity of "thermit" used. The "thermit" is covered with a layer of kindling or priming mixture, and an iron plate having a central hole, through which the charge can be ignited by means of a fuse, is placed over the whole. The crucible thus prepared is placed with its tap-hole immediately above the gate of a refractory mould built around the ends of the two rails to be jointed, which are so clamped together that the surfaces to be welded are pressed against each other. When all is ready, the charge is ignited, and in a few seconds the contents of the crucible should become fluid, and melting away the supporting iron plates, should flow into the mould and make the required joint. In this process it is the molten iron which first enters the mould, and the molten corundum slag floating on the top passes out last, instead of first as in the older teeming process. The method lends itself well to the jointing of rails already laid, and ensures a sound electrical contact; it is of no use, however, for rails of which the ends are worn, as it does not assist in checking the hammering of the wheels on the rails. The process cannot well be applied to the welding of tubes, as the hot metal is liable to melt its way through the tube at first contact; it is, however, very suitable for the repair of broken shafts or axles, and is especially recommended for use on board ship, as the appliances required are exceedingly simple and convenient. — *N. Y. Evening Post.*

New York's most valuable Buildings. — The following list includes many, but probably not all, of the buildings in New York City that are assessed this year at a valuation of a million or more dollars: —

OFFICE-BUILDINGS, 1902.

Produce Exchange	$3,000,000	Astor Building	$1,500,000
Bowling Green Building	2,500,000	A. L. Stevens Building	1,175,000
Washington Building	1,560,000	American Exchange National Bank	1,000,000
Empire Building	2,400,000	National Bank of Commerce	2,000,000
Standard Oil Building	2,250,000	Trinity Building	1,000,000
Exchange Court	2,250,000	Boreel Building	1,600,000
Consolidated Exchange	1,300,000	Havemeyer Building	1,000,000
Union Trust	1,600,000	Western Union Building	1,400,000
Wilks Building	1,150,000	National Park Bank Building	1,100,000
Stock Exchange Building	2,100,000	St. Paul Building	1,200,000
Commercial Cable Building	1,200,000	Park Row Building	2,400,000
Johnston Building	1,800,000	Potter Building	1,150,000
Lord's Court Building	1,150,000	American Tract Society Building	1,000,000
Mills Building	2,100,000	Pulitzer Building	1,500,000
Broad Exchange Building	3,250,000	Postal Telegraph Building	1,350,000
Drexel Building	1,200,000	Mutual R. F. Association Building	1,050,000
Atlantic Building	1,800,000	Stewart Building	2,000,000
National City Bank (Custom-house)	2,800,000	Central National Bank Building	1,200,000
Manhattan Company Bank	1,800,000		
United Bank	1,450,000		
American Surety Building	2,000,000		
Hanover National Bank Building	1,300,000		

INSURANCE-BUILDINGS, 1902.

Manhattan Life	$1,500,000	Washington Life	$1,700,000
Mutual Life Company	4,700,000	New York Life Company	3,000,000
Equitable Life	6,350,000		

HOTELS AND APARTMENT-HOUSES, 1902.

Astor House	$2,000,000	Imperial	$1,250,000
Fifth Avenue Hotel	3,000,000	Sherry's	1,100,000
Waldorf-Astoria	6,000,000		

THEATRES, 1902.

Metropolitan Opera-house	$1,500,000

FIFTH-AVENUE RESIDENCES, 1902.

756 — Cornelius Vanderbilt, estate	$1,550,000

Difficulty of disposing of Italian Family Art-treasures. — The difficulty experienced by any Italian who wishes to dispose of one of his family art-treasures has been much discussed of late, but we make no excuse for quoting from *The Athenæum* some notes on the subject just contributed to that journal by its correspondent in Rome. This gentleman is Professor Rodolfo Lanciani, whose authority in matters of art and archæology is widely recognized both in Europe and in the United States. He writes: "Commendatore Carlo Fiorilli, the genial Director-General of Antiquities, has published a report on the *attività amministrativa* of his department from January, 1900, to June, 1901. The volume is full of useful information as regards the safe keeping of antique monuments, the results of excavations, the new acquisitions of museums and galleries, etc. As regards the case against Prince Chigi on account of the famous Botticelli "Madonna," Commendatore Fiorilli's report says (page 164): In June, 1899, Prince Don Mario Chigi sold, for 315,000 lire, to Edmond Desprez, of the Colnaghi house of London, by the arrangement of Signor Enrico Pardo, the famous picture of Botticelli, 'La Vergine col Bambino benedicente l'Offerta d' un Angelo.' In announcing the sale to the Ministry of Public Instruction, Prince Chigi declared the purchaser to be a certain Lazzaro Papi, no trace of whom, it seems, could be found. The affair was brought before the first section of the Penal Court on October 24, 1900, and Prince Chigi and Desprez were condemned to pay a fine of 315,000 lire, the value of the lost picture. The Court of Appeal revised this judgment on February 28, 1901, reducing the fine to 2,000 lire, which was further reduced to a nominal sum of 200 lire, in consequence of a royal amnesty for offences of this nature granted on November 11, 1900. From this sentence both parties again appealed to the Supreme Court, the decision of which has just been published. It is in favor of a new trial before the Court of Appeal of Perugia. I am told, however, that the wording of the decree is such as to leave the condemnation of Prince Chigi and Edmond Desprez to the full penalty of the law a foregone conclusion. From the same official publication I learn that the Princess Barberini-Sacchetti has been reported to the Public Prosecutor for having sold to the Louvre Museum, without proper license, the famous ivory diptych of Constantine, and the not less famous Siculo-Arab vase 'ageminated' in silver. She is also charged with selling to an unknown person the most precious codex of the Barberini Library. The tapestries belonging to the same family, and marked with the coat-of-arms of Pope Urban VIII, were sold to an American gentleman some years ago. I learn, in the third place, that Signor Enrico Pardo (the Botticelli agent mentioned above) and his partner, Signor Sanguinetti, have been condemned to pay 140,000 lire each for having sold illegally to an unknown purchaser the bust of Bindo Altoviti, modelled by Benvenuto Cellini. The Pope's government was so jealous of the safe keeping of this masterpiece that it caused it to be chained to the wall of the reception-room of the Altoviti Palace in the Piazza di Ponte S. Angelo. The bust was removed to Florence in 1888, when the Altoviti Palace was demolished to allow for the widening of the bed of the Tiber." — *Exchange.*

Afridi Wax-cloth. — Mr. George Watt, the Reporter on Economic Products to the Government of India, has succeeded in inducing the Afridi wax-cloth workers to impart the secret of their craft, which has hitherto puzzled all inquirers into Indian industries. Afridi wax-cloth, a kind of raised colored painting on cotton fabrics, has been made almost from time immemorial, and is a well-known product of certain workshops in Peshawar, Lahore, Calcutta, and Bombay; but until Mr. Watt set about his inquiries complete ignorance prevailed, outside the circle of artisans, as to the constitution of the medium employed. With the assistance of Mr. Roe, the Secretary to the Peshawar Municipality, Mr. Watt was able to ascertain that the medium, known as *roghan*, is a peculiar product of the safflower seed. The method of preparation, which is carried on entirely at Peshawar, is to boil the oil — expressed from the seeds by cold pressure — for twelve hours, and then throw the heated fluid into shallow pans of cold water. Under this treatment it swells up into a thick jelly-like substance, which is the *roghan* of commerce. Before being applied to the cloth it is mixed with some mineral color and drawn out into fine threads on a pointed style, with which the pattern is traced. The operators, who are invariably Afridis, attain a very high degree of skill, and possess marked artistic abilities. The weight of Afridi wax-cloth — an Afridi woman's costume would turn the scale at over thirteen pounds — makes it unsuitable to articles of European dress; but the ever-increasing demand for household drapings gave a ready outlet for the Afridi artisan's skill, to which he has readily adapted himself. Careful tests made in Calcutta also showed that as a waterproofing material, or as a material to be used in the manufacture of linoleum, *roghan* has a distinct claim to careful consideration, and is in some respects superior to linseed. Systematically exploited, there would appear to be a promising future before this industry. — *The Times of India.*

The Commercial Value of the Paris Exposition to Foreigners. — The French Customs Department has just published a report for 1900, which throws much light on the direct commercial results of the recent International Exhibition at Paris. Fifty-nine countries forwarded their merchandise (food and drinks not included) to the value of 250,000,000 francs, but the sales amounted to only 7,500,000 francs. The United States sold to the value of 1,657,000 francs out of 29,000,000 francs; Germany, 1,510,000 francs out of 23,000,000 francs; England, 905,000 francs out of 20,000,000 francs; Italy, 389,000 francs out of 26,000,000 francs; Russia, 352,000 francs out of 22,000,000 francs; Belgium, 255,000 francs out of 19,000,000 francs; Austria, 188,000 francs out of 23,000,000 francs; and Hungary, 166,000 francs out of 42,000,000 francs. Customs duty to the amount of 778,000 francs had to be paid on these sales, nearly half of which consisted of machinery, artistic objects figuring for only 55,000 francs. Taking the general imports for the year 1900, the foreign merchandise at the Exhibition represented only 4.18 per cent, and the sales only .16 per cent. "The various amusements offered to the public," remarks the *Messager de Paris*, "may have been manifold, but the capital expended has been enormous, as had been predicted by all those who, remembering the exhibitions of 1867, 1878, and 1889, justly maintained that that of 1900 would not be successful. — *N. Y. Evening Post.*

An English Jeer at our Architecture. — The negotiations between an Anglo-American syndicate and the London County Council for the acquisition of a large block of land in the Strand for the erection of a "world's wonder," in the shape of a mammoth office-building, have been broken off for the present on a mere trifle, writes John Hollingshead. The syndicate demands a lease for 999 years, just a little short of eternity, and the London County Council find that they are only empowered to grant a lease of ninety-nine years — a slight reduction. Every devout Londoner will call down all the blessings of creation on the Local Government Act which imposes these fetters on municipal action. The design of this mammoth building, as far as the plans have been disclosed, is to be of the Early Packing-case order of architecture developed by the sucking Palladios of Chicago, and sometimes known as the Perpendicular Goth and Vandal style. We have a feeble imitation of this penal architecture at "Queen Anne's Mansions," within "measurable distance," to use tailor's English, of Westminster Abbey, but no one has yet proposed to face Sir William Chambers's façade of Somerset House — much esteemed by persons who respect "Shakespeare, taste, and the musical glasses" — with a building like a glorified cotton-mill in Lancashire, adorned with Twelfth-cake ornaments. Such buildings may or may not tempt and encourage earthquakes, but they will certainly eclipse all our candle-lamp "monuments." — *Pall-Mall Gazette.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, MARCH 8, 1902 No. 1367

CONTENTS

SUMMARY: —

The Paterson, N. J., Conflagration and some Lessons to be drawn from it. — Dwelling-houses as Fire-risks and the unduly high Insurance Rates they have to pay. — Death of Henry G. Marquand, Amateur of Art. — Death of Albert Bierstadt, Landscape-painter. — The Tariff on Works of Art. — The French School at the Villa Medici, Rome. 73

LETTER FROM WASHINGTON. 75

COMMON ACCIDENTS IN BUILDING. 77

ARTISTS' PROTEST AGAINST THE TARIFF. 79

ILLUSTRATIONS: —

St. Peter's R. C. Church, Columbia, S. C. — Preliminary Study for the Same. — United States Custom-house, Baltimore, Md. — Club-house of the A. D. Club, Cambridge, Mass.

Marquetry Panels for the S.S. "Orontes."

Additional: Members' Entrance: A. D. Club, Cambridge, Mass. —Store Entrance: A. D. Club Building, Cambridge, Mass.— The Imperial Post-office, Berlin, Prussia. — The Imperial Museum, Constantinople, Turkey. — Models for the Washington Improvement Scheme. — Treatment of the White House Lot, Washington, D. C. 80

COMMUNICATION: —

The Number of the Architects to be eligible for New York Municipal Work. 80

NOTES AND CLIPPINGS. 80

THE Continental Insurance Company, of New York, has published an interesting account of the fire at Paterson, with photographic illustrations, showing very effectively the value of reasonably fireproof construction in checking a conflagration, and the danger of the mixture of wooden and brick buildings which prevails in all our large cities except New York. Briefly, the Paterson fire began in a wooden shed, spread, aided by a wind blowing at the rate of sixty miles an hour, to a block of ten wooden houses near by; then, its intensity having been augmented by the additional fuel, it seized on a cluster of buildings, consisting of a large brick stable, surrounded by wooden sheds. The flames then burst through the rear windows of a block of brick stores close by; while the showers of sparks set fire to other wooden buildings in the neighborhood; and the conflagration, fed by the combination of brick buildings filled with wooden floors and inflammable goods, and structures entirely of wood, soon swept everything before it, until it was stopped at five points by brick buildings, from one to five stories high, but having in most cases blank walls on the side most exposed to the flames. The interior woodwork of some of these brick buildings was burned, by fire getting in through unprotected windows; but it appears, more evidently, perhaps, than ever before, that a good blank wall of brick, even if twelve inches thick, or less, is impenetrable to almost any conflagration.

ANOTHER lesson that the Paterson fire, like several other recent ones, teaches is that a really fireproof building forms a bulwark against the spread of a conflagration which is of incalculable value. How many millions of dollars were saved to the insurance companies of Paterson by four or five brick walls it would be difficult to say, but the amount was certainly large enough to make it worth while for underwriters to encourage the building of plain brick walls and terra-cotta floors by the utmost possible reduction in premium rates. We do not say that a hotel of iron and brick or concrete, but with large, unprotected windows, ought to be insured at a rate which would not cover the probable loss in case a fire occurred near it; but where the owners are willing to add to their solid brick walls and floors of masonry wire-glass windows, or tin-covered shutters, they should be encouraged by a reduction of their premium rates to the lowest possible point, the insurance-companies bearing in mind that in case of a large fire in the neighborhood, such a building would probably save them, by keeping the fire back, more money than the premiums on it would amount to in a hundred years. In the same way, every dwelling-house owner in a city who builds with iron floor-beams, joining two solid party-walls, is, virtually, erecting a fort against conflagrations, and should be encouraged in the same way.

THE insurance-companies are said to have used the Paterson fire as a pretext for a twenty-five per-cent increase in premium rates everywhere, on everything except mercantile buildings and merchandise. Practically, the fire seems to have demonstrated, even more strongly than before, that a mercantile building is the worst of all risks, while modest brick dwellings, with solid party-walls between them, possess unexpected powers of resistance, so that the logic of increasing the rates on the latter, and leaving them unchanged on the former, will not be quite clear to architects; but, as they have learned that any questions or suggestions on their part seem only to call down on them a storm of abuse from the underwriters, they are likely to keep their observations to themselves. Meanwhile, however, speaking in behalf of ordinary people, it may be well to call attention to the disasters which Boston, particularly, is preparing for itself by its neglect to extend the fire-limits to the outlying wards. As Paterson has just shown, as Boston itself showed thirty years ago, and as it will show again before many months, a mixture of wooden and brick buildings is a continual invitation to a terrible conflagration; yet Roxbury, Dorchester and Brighton are filled with wooden structures, in many cases tenement-houses, four or five stories high, among which a fire, if it should once gain headway, might spread for miles. It is true that many owners, appalled at the danger, now build of brick, although not required to do so; but the number of brick buildings is too small to offer any effective barrier to the spread of a conflagration; and, as no law can, in this country, compel a man to pull down a building erected in conformity with the regulations then in force, there can be no radical change until the wooden buildings have been burned away, — and paid for twice over, it may be remarked, by the holders of insurance policies. It is, therefore, those who hold, and pay for, contracts of insurance who must, ultimately, buy, at an enormous cost, these wooden buildings, before the ground can be made ready for better ones. It is common to imagine that the underwriters exert their influence in favor of greater security of construction, and that, if the wooden suburbs of Boston were really so dangerous, they would second, before the Legislature, the urgent appeals of the Commissioner of Buildings for the extension of the fire-limits; but the underwriters trouble themselves very little about dwelling-house property, which, even in such localities, pays a disproportionately high premium rate, devoting their lamentations, and their objurgations against architects almost entirely to mercantile risks, which are notoriously insured too low, owing to the competition of the companies for large policies. We should be as much pleased as anybody to see the suggestions of the underwriters in regard to the construction of mercantile buildings generally complied with, and have always done our best to show the value of them; but architects look impartially on all classes of buildings, and the assistance of the underwriters in rating dwelling-house property fairly, and in promoting legislation to protect it, would be appreciated by them.

IN the death of Mr. Henry G. Marquand American art loses one of the sincerest and most faithful friends that it has ever had. For nearly fifty years he has been perhaps the most conspicuous and most intelligent of all American patrons of art, as well as the most generous and unwearied in all endeavors to educate the public taste, and bring to the minds of the people the happiness and refinement which art can bestow. Although of a fortune modest in comparison with the gigantic wealth of some of the beneficiaries of the system of high protection, Mr. Marquand, early in life, was able to surround himself with the beautiful things which he loved and understood so well, and he made it a matter of conscience to lead the way in the path of artistic cultivation. His house was one of the most refined works of the late Richard M. Hunt, and was filled with the best attainable decoration and furniture. Two of the ceilings were painted on canvas for the house by Sir Frederic Leighton, and higher praise could hardly be given them than to say that they were worthy both of the artist and of his patron. It was not, however, for himself that Mr. Marquand collected beautiful objects. He had been among

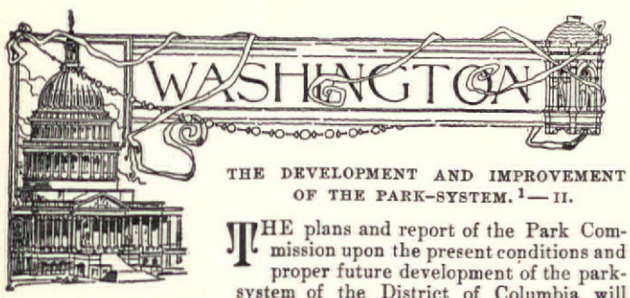
Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

the first, as he was the most energetic, in endeavoring to raise funds for the establishment of a Museum of Fine-Arts in New York. As our readers know, the Metropolitan Museum was, in the beginning, entirely a private enterprise. The city gave a site for the building in the Central Park, but the building was erected, equipped, maintained and filled with works of art wholly by private generosity, and among the public-spirited men who gave their time and money to the undertaking Mr. Marquand was the chief. Not only did he, with the others whose memory is so affectionately cherished in New York, contribute money enough to build a structure adequate for what they foresaw would be required of it, but he is said to have given to the Museum, during his lifetime, works of art to the value of more than a million and a half of dollars. It is a pleasure to think that Mr. Marquand, and many of his associates, lived long enough to reap the reward of their good deeds in the knowledge that the Metropolitan Museum has been one of the most important factors in the refinement and elevation of the people of New York; and, although it has now far outgrown its early limits, and has, by bequests and gifts, become, perhaps, the most richly endowed institution of the kind in the world, it was the energy and unselfishness of these good men which made it possible; and, without Mr. Marquand, Mr. Johnston and their friends, New York would, very probably, be still without any fine-art collection open to the public.

MIDDLE-AGED people will hear with regret of the death of Albert Bierstadt, for many years the most noted of American landscape-painters. It must be nearly half a century since Mr. Bierstadt startled and delighted the unsophisticated American public with a series of very large paintings of imposing pieces of natural scenery in the Rocky Mountains and elsewhere. These pictures were executed with great talent, if not with very profound feeling, and the painter would probably, in these days of more extended knowledge and sounder criticism, have been developed into an artist of the very highest rank; but, in an evil moment, the showman got hold of him, and it was found profitable to carry his large canvases around the country, fit them up with a frame of curtains, illuminate them by artificial light, and exhibit them to awestruck audiences at twenty-five cents a head. To paint with the object of astonishing uncultivated people, with the aid of glaring lights and theatrical accessories, would spoil the greatest artist that ever lived, and, even if it did not spoil the artist, it would ruin his reputation among people of discrimination, so that it is not surprising that Bierstadt's less pretentious works, some of which were of great merit, were overlooked, and that a suspicion of charlatanism fell upon him, which was not lessened, in the minds of those who knew the scenes which he painted, by the boldness with which he improved upon nature for the sake of pleasing his audiences. This manner of viewing fine-art was, in that day, at least pecuniarily profitable; and before advancing public taste had fully decided to disapprove of the theatrical display of pictures, he was able to console himself with a considerable fortune for the loss of his preëminence among American painters, and for many years, he had lived quietly, painting little, or, at least, exhibiting little, but enjoying the friendship and regard which his many kind deeds brought him. Some time, we trust that it may be possible to get together some of Bierstadt's less pretentious, but better studied, pictures, and show them, with some of those of Moran and Church, who painted similar subjects at about the same period. The comparison between these three, in the light of our present views of landscape-painting, would be extremely interesting; and, in fact, we can hardly think of anything more interesting, as a "between season" affair, than a retrospective exhibition of American landscape-painting, taking in Bierstadt, Church, McEntee, Thomas Moran, Kensett, William Bradford, Hunt, Gifford and Inness, with, perhaps, a few others. We may be sure that Americans would have no reason to be ashamed of their painters of the last generation, and, if La Farge and Richards would consent to be represented in the collection, it would not be easy, in any country in the world, to get together a greater variety of beautiful work of the kind.

THE New York *Times* makes a suggestion which is of great importance in connection with the energetic movement now in progress for securing the abolition of the customs duty on works of art. This duty, we need hardly say, has, apparently, not a single defender. Nearly all the respectable artists in the country have united, at short intervals, in vigorous protests against the barbarian policy of depriving the country of the costly, but precious, means of instruction in refinement and taste which so many of our citizens would bring here if we would let them; Congressmen, who have the remedy in their hands, individually disclaim all sympathy with the exclusion of such treasures; yet, collectively, they are unwilling to do anything to modify or repeal the existing law. Meanwhile, the most precious pictures and statues in the world are rapidly disappearing from the market. Anything of the kind that reaches a public museum in Europe is, of course, thenceforth unattainable, and, as it happens, political and financial troubles have, just now, brought to sale an unusually large number of works belonging to private owners. The same troubles have affected the museums, so that they have, in many cases, less than their usual resources for making new acquisitions, and the moment is, therefore, particularly favorable for rich Americans to secure what will probably never again be within their reach. It is needless to say that the works of art which rich Americans buy are almost always exhibited with the greatest liberality for the public benefit, and it is the whole American people which is interested now in giving all possible opportunity to those of their fellow-citizens who are able and willing to do so to buy pictures and statues which are sure to be used for the general good. A year from now conditions may be changed, and, in any case, the best of the works now in the market will have been secured by the European museums; so that prompt action by Congress in doing that which Congressmen themselves almost unanimously acknowledge to be desirable, and which the people of the country have for years demanded, may be of incalculable value.

ARCHITECTS who read French, and, particularly, those who have been members of the Paris School of Fine-Arts, or of a school *atelier*, should not fail to get the issue for February 1 of *Le Monde Moderne*, which contains a charming article, by Paul Gsell, on the Prize of Rome students at the Villa Medici, with many illustrations, beginning with a brief, but very interesting, history of the foundation and early days of the French Academy at Rome. The origin of the institution is said to be found in the desire of King Louis XIV to possess in his palaces copies of the masterpieces of antique sculpture. Nicolas Poussin, who then resided at Rome, was requested to take charge of the organization of the new school, but declined, on account of failing health, and it was not until 1666, a year after Poussin's death, that the new Academy was established, under the direction of the painter Errard. The regulations prescribed that twelve students should be admitted, six painters, four sculptors and two architects, all of whom must be French by birth, and Catholics in religion. They were forbidden to blaspheme, and were required to say their prayers morning and evening. In summer they were obliged to rise at five, in winter at six, and ten o'clock was bedtime all the year round. During their meals, one student, designated by the director, read history to them. The ambassador of France at Rome was requested to make occasional visits to the Academy, with his wife, as a polite attention to the students, and the sculptor Bernini, who understood the art of making friends, delighted the King and his Minister, Colbert, by volunteering to advise the young French artists. Great numbers of copies of pictures and casts of sculpture were made by the students and sent to Paris, with regular reports of the conduct of each member of the school. In 1792, the Academy was suppressed by the Convention, but it was reëstablished by the Directory, three years later, and the number of students increased to twenty-four. In 1803, the Academy, after having been lodged in various palaces in the city, was removed to the Villa Medici, where it has been domiciled ever since. For many years the French Academy has been very popular in Rome, both in the royal and papal courts. It will be remembered that, a year or two ago, an excellent portrait was published of the present Pope. This portrait was a reproduction of one painted by a student of the school, M. Chartran, to whom the Pope accorded the unusual favor of several sittings; and, from the other side of the Tiber, the Queen of Italy regularly visits the annual exhibition of works by students of the Academy, which is held from the first to the fifteenth of April. Among themselves, the students have various customs, and are subjected to various rules, for which we must refer our readers to M. Gsell's paper, where they will find also an interesting discussion of the merits of the present system of admission.



THE DEVELOPMENT AND IMPROVEMENT OF THE PARK-SYSTEM.[1] — II.

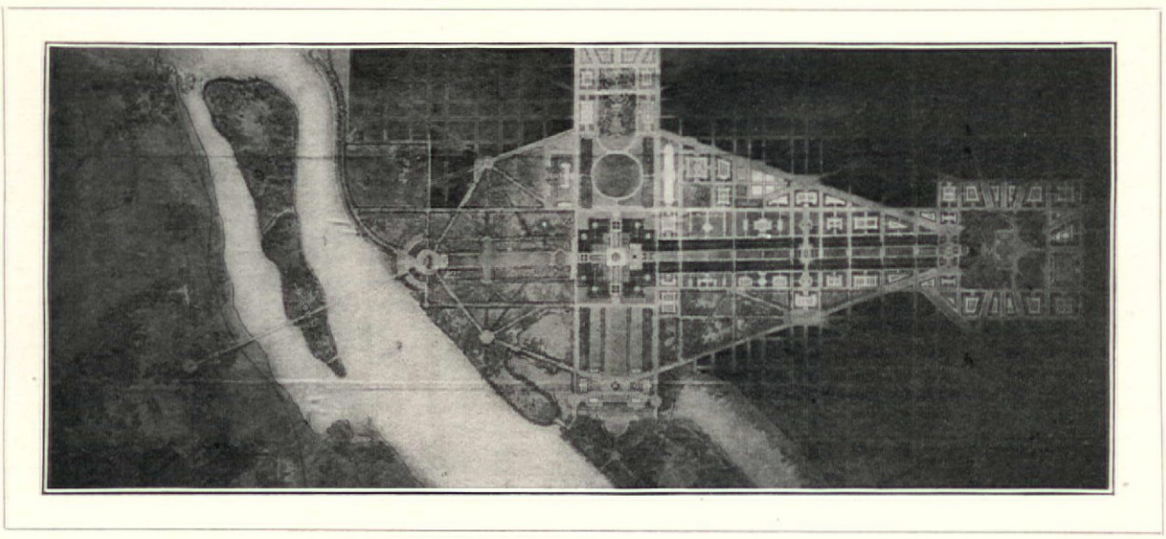
THE plans and report of the Park Commission upon the present conditions and proper future development of the park-system of the District of Columbia will come in the minds of those who are interested in national æsthetics to mark a stage in our intellectual progress, and, at the risk of giving a somewhat Hibernian turn to the metaphor, it might be added that the progress is not so much an advance as it is a return to the better sense and better taste of the founders. We have retreated to our base of supplies, and now we mean to march forward on the right road, with Washington and his lieutenant, L'Enfant, riding at the head of the column.

From another point-of-view, the material one, the conception of so splendid and costly a scheme by men of practical judgment and experience is highly significant of the greatness of our national prosperity, for their scheme involves the expenditure of as yet unreckoned millions of money. It may be that the plain people of the country will at first consider it as a dream impossible of realization.

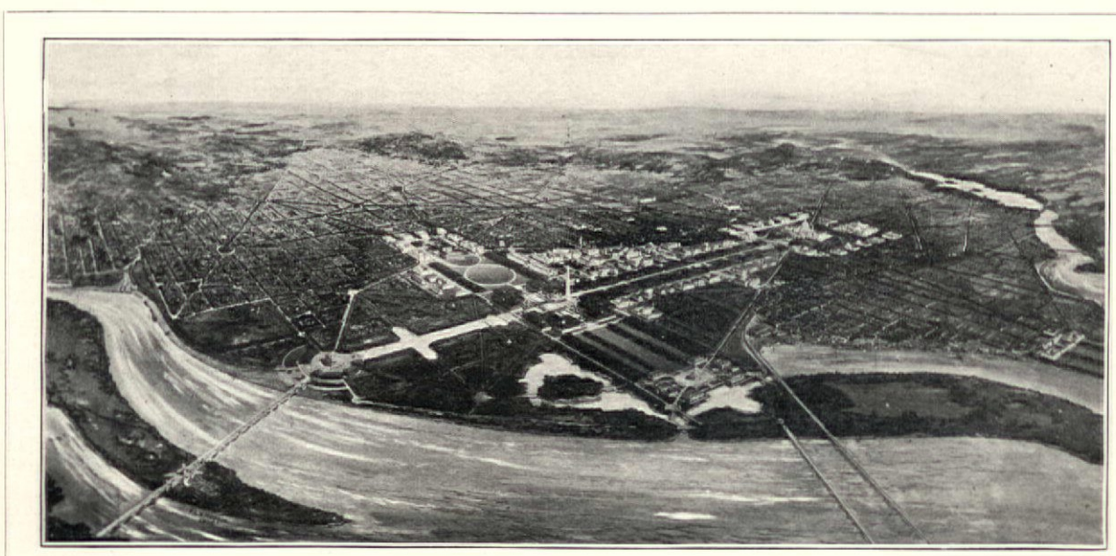
It is in fact, I believe, the biggest scheme of city treatment as yet projected, the most extensive problem in landscape-architecture which has been undertaken. So I am told, and we rather like to measure our achievements against those of all time and of the world, and to express them in superlatives.

Studied, however, in the light of a plan not only for present needs but for the Nation's life, it will come to be understood as no more than adequate, no less than a fitting expression of the Republic's dignity. The scheme will be laid before the people again and again in the technical journals, explained to them in word and picture in the important magazines and exhibited in some of the great centres until its lesson is learned. The lesson is one in the principles of an art which includes most of the arts, but which, as an essentially busy and utilitarian people, we have not as yet had time to study as it deserves. There is little doubt of the ultimate acceptance of the plan as the right one for Washington's development and adornment and as one perfectly practicable. The people will want this thing done for the country's sake, for their own education and edification and for their children and children's children. Whether they will soon be able to impress upon their representatives in Congress the assurance of their supporting the necessary appropriations is another matter.

There is much encouragement for us in the way this plan has come about. The awakening of our people to the beauty of a studied disposition of buildings in ordered landscape began with the Chicago Exposition of '93. Since that event the general interest in such matters has grown rapidly, as things well started have a way of doing in this favored land.



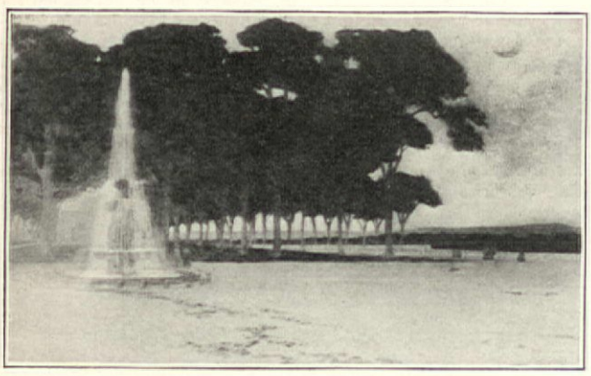
While the immediate impulse in this case came from the architectural bodies and art societies, it is true that persons of intelligence and taste have been working individually toward the same end for a long time. The Senate Committee on the District of Columbia happens just now to contain a good deal of this sort of intelligence and to enjoy in its present chairman the leadership of a man of more than ordinarily comprehensive attainments. Having acted with rare promptness upon the advice of the artistic professions, even to the extent of appointing the commission of experts nominated by them, the Senate, in presenting to the country the admirable result of their labors, looks to have it appreciated, accepted, and always strongly supported by those bodies.



The plan is admirable. It stands close criticism. We wanted a working-plan for the improvement of the national capital. Here is one which has grown out of close and comprehensive study of all the conditions. The Park Commission was given a free hand as to cost

[1] Continued from No. 1362, page 36.

of investigation. It was generously aided by the various departments and officers of Government. It covered the ground at home and abroad as no individual could hope to cover it. The membership of the Commission could not have been improved upon. We must now accept the plan it gives us as the best one possible, and work for its adoption. Let the promptings of individual talent — there are, alas, already those who would demonstrate how much better they



View from Base of Monument towards Arlington.

could have done it — be sternly disregarded, and let us work loyally together for the common good.

This should be all the more easy from the modest attitude of the Park Commission, which presents its beautiful project as simply an amplification of the design Pierre Charles L'Enfant worked out under the direction and assistance of Washington and Jefferson.

Major L'Enfant was a young French engineer of ability, who came highly recommended to Washington for the performance of this work. The work was admirably well done — and, incidentally, not entirely paid for, which is a way we have in republics sometimes.

This plan after a century's trial has had universal approval. It has been a model for city-building and improvement all over the world. It deals with Washington as distinctively a capital city. It provides a convenient and beautiful arrangement of streets in which the first consideration was the location of public buildings and grounds, the determination of each site in reference to every other site, and of lines of communication between them. It studies the reciprocal relations of buildings, vistas and axes, parks and pleasure-grounds, fountains and canals, monuments and museums, noble groupings of foliage and water decoration.

The present Park Commission found this plan, marred as it has been by deplorable but not incurable departures, perfectly adequate, with some elaboration, for all our needs of to-day and of the future, and they determined to adhere to it. They thereby "acquire merit."

Taking L'Enfant's Mall and his axial treatment of the Capitol, the Washington Memorial, and the President's house as their working basis or point of departure, they form in a study of the evident prototype of L'Enfant's design — Le Nôtre's masterpiece, Versailles — the inspiration of the project they so superbly demonstrate in this exposition at the Corcoran Gallery of Art. A summer tour to Rome, Venice, Vienna, Buda-Pesth, Frankfort, Berlin, Paris and London gave them a review of famous examples of city-making and landscape-architecture, and in their scheme for the beautification of Washington, they give us the charm of many noted places.

Here we shall rival the classic monuments and noble fountains of Rome, the broad-stretching vistas of Paris, the quays and embankments, bridges and general river-treatment of London, Buda-Pesth, Paris, and especially the grandiose conceptions of Le Nôtre, the unquestioned master of landscape art. Even a slight comparison of the plans of Le Nôtre's Versailles, of L'Enfant's Washington, and of the Park Commission's greater Washington, will disclose insistent analogies and resemblances which put the sources of inspiration beyond a doubt.

In Le Nôtre's plan the principle of axial relation followed to its ultimate conclusions gave the Latin-cross form, which is that of our own scheme. At Versailles are also those diagonal extensions at the sides and about the head of the cross which lends to Washington its peculiar kite-shape. The rond-point at the head of the cross, the radial system of roads and paths are again resemblances. In fact, the rectangular divisions of the garden-terrace at Versailles, if overlain with the secondary system of rond-points and radial avenues which run through the domain, would give the essential feature of L'Enfant's plan of Washington.

At the risk of repeating points referred to in a former letter, I wish to again call attention to certain strong features of the Commission's report:

The Commission has formulated certain precepts as to the locations of public buildings: (1) That only public buildings should face the grounds of the Capitol; (2) that new Department buildings may well be located so as to face Lafayette Square; (3) that buildings of a semi-public character may be located south of the present Corcoran Art Gallery, fronting on the White Lot and extending to the park limits; (4) that the northern side of the Mall may properly be used by museums and other buildings containing collections in which the public generally is interested, but not by Department buildings; (5) that the space between Pennsylvania Avenue and the Mall should be occupied by the District Building, the Hall of Records, a modern market, an armory for the District militia and structures of like character.

In all of these cases except the fourth cited it would be necessary for the Government to acquire by condemnation and purchase large bodies of ground, of high value about Lafayette Square, of lesser but still considerable value along Pennsylvania Avenue, and at moderate cost elsewhere.

The very generous and public-spirited action of the Pennsylvania Railway, through its President, Mr. Cassatt, in agreeing, should Congress decide to carry out the project of the Commission, to give up its grant upon the Mall, to remove its tracks and station thence to a site chosen for them, and to bear its share in the construction of a magnificent union station, in white marble and of Classic architecture, to tunnel Capitol Hill for its southern connection, and to eliminate grade-crossings as the engineers have planned, remove all obstacle to the beautification of Washington except the need of legislation and appropriations. To preserve uniformity of effect the Commission prescribes that all buildings public or semi-public in character to be erected within the limits of the general treatment proposed shall be designed in the Classic orders and built of white marble.

There is no space in this paper for a discussion of the Commission's proposals for park extensions and connections, for driveways and roads and bridges, quays and embankments. This part of their subject has been exhaustively treated and is of immense importance. Their plan involves the reclamation of the whole river-front of the city, which is to be made sanitary and sightly. Its present state is deplorable. The valley of Rock Creek from its mouth to the Zoölogical Park will be rescued from its present squalor and unloveliness. The river-roads will be improved and the beauties of the gorge of the Potomac above Georgetown brought into the scheme of parked driveways which are to connect the outlying parks and completely encircle the city. The fever-breeding flats of the Anacostia will become a water-park and the navigable stretch of that stream down to its junction with the Potomac will be restricted to a dredged and walled channel, out to which the bed will be filled on both sides.

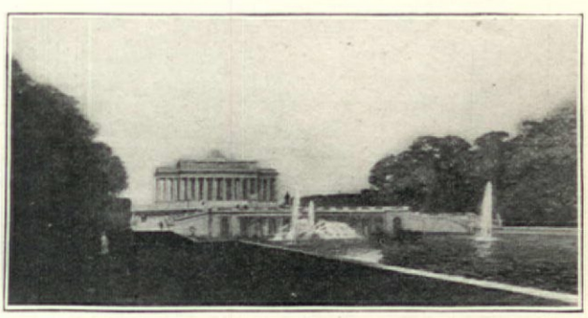
Another glance at the treatment proposed within the city proper and this attempt to sketch-in the mere outlines of the project will be done.

L'Enfant explained that the essence of his plan of the city was the idea "to preserve through the whole a reciprocity of sight." His radial avenues attain that end most admirably. These make, with the triangles and circles which occur upon the maps where they cross one another or cut the grillage of lettered and numbered streets, the glory of the city and give suggestions of infinite possibilities of enhanced beauty. This "reciprocity" is nowhere disturbed in the new plans.

Its application to the axes of the Capitol, the Washington Monument and Lincoln Memorial, the White House and the river arm of the cross is the basis of the whole development. The aberration of the actual site of the Washington Monument from the axial lines is cleverly adjusted. "The Commission proposes by a simple device of planting," says the Report, "to bring the Monument into the Capitol vista, so that the observer standing on the west terrace of the Capitol shall look off over a green carpet, bordered on each side by four rows of elms, to the Monument rising from a plain."

Beyond this border of stately trees will stand, on either hand, buildings in white marble of Classic design, uniform in scale and in ample grounds. Those on the north will house the museums and public collections; those on the south, the scientific bureaus. There will be space for this arrangement within the sixteen-hundred-foot width of the Mall.

The broadening of the base of the cross about the Capitol by taking in the squares giving upon the grounds to afford sites for buildings auxiliary to the Houses of Congress gives admirable balance to



Showing proposed Development of Site for Lincoln Memorial.

the plan and is delightfully convincing as seen in the views and model. The restoration of the beautiful Bulfinch gates, the fountains, terraces, basins, equestrian statues and approaches where the Mall ends at the foot of the Capitoline Hill will add great dignity to the view from the Mall. Incidentally, it is to be hoped, perhaps, that our new statuary may not be so inevitably horsed.

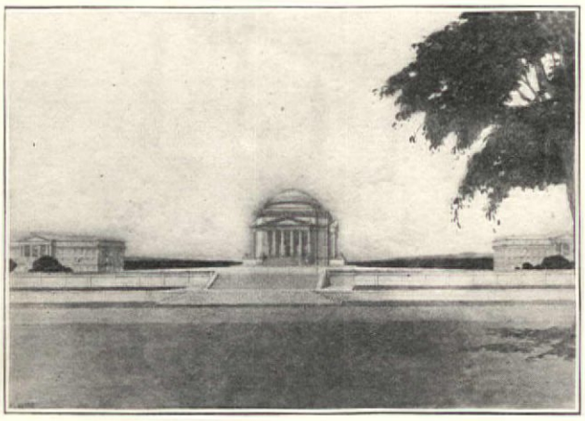
The terraces, with formal tree-masses and pavilions, broad approaches and a sunken garden on the west about the Monument will

add a proper base and ennoble the effect of the Monument without detracting in the least from its soaring height. In the whole plan of the Commission appears nothing more commendable than the setting given the great obelisk. A square measuring sixteen hundred feet on a side, described by the intersecting axes of the Capitol and the White House, at the full width of the Mall reservation, is terraced with marble walls and parapets. This encloses an interior square of twelve hundred feet, a sunken garden adorned with a water-decoration of cascades and a great round basin which marks the centre of the cross and in which the shaft of the Monument reflects. This formal garden, in the words of the Report, becomes "the gem of the whole park-system."

The Monument itself as a simple and noble expression of beauty and grandeur combined is, beyond measure of words, impressive. A mighty shaft of white against the blue, a pillar of purity against the clouds, with storm about its head or rising calm and glittering in the moonlight, it towers above the city and dominates the prospect from every point, as the great man whom it commemorates and typifies stands over the nation ever and guides the destinies he set in motion. It was fitting that his Memorial should stand at the heart of his city's beauty. There is a symbolism in its place upon this plan as the goal of every view.

Here again L'Enfant's idea lives. One may fairly well realize the effect of this terrace and garden by recalling the gardens of the Luxembourg, which, however, lack the superb vistas we shall enjoy here.

The grandest looks west from the Monument to the head of the cross-plan, over the garden down the long perspective of a great basin, again cruciform, between ranks of trees, to the rond-point. This circle is ringed with trees forming a peristyle from which radiate avenues. An eminence circumscribed by the encircling roadway will be crowned with the proposed Memorial to Lincoln, a Doric portico in rectangular form, 250 feet in length and 220 feet in width, on a continuous stylobate or base, approached by broad flights of steps on the east and west, and bearing a panel with appropriate



Suggestions for Public Buildings.

inscription. This portico will have groups of sculpture and be "surmounted by a central crowning group of statuary."

The avenues radiating from this centre lead to Potomac Park, to the Memorial Bridge, to Arlington, and by the Riverside Drive to the Rock Creek parks.

The whole parallelogram west of the Monument Garden has the width of the Mall, 1,600 feet, and extends for a mile to the Potomac. The canal, or water-avenue, which lies in the Capitol and Monument axis is 3,600 feet long by 200 feet in width. The treatment of the whole area about the top of the cross-plan is more sylvan and affords relief from the formalism properly held elsewhere. In the middle-distance curves the river, and beyond are the tree-covered Arlington hills against the sky.

The grouping of new Department buildings about Lafayette Square, the provision for Executive Offices and reception-halls in one of these, thus permitting the White House to remain exteriorly as it is, the creation of a beautiful vista southward from it over the White Lot, the Monument Gardens, Washington Common, with its proposed stadium, playgrounds and theatre, to the Memorial to the Republic by the river-shore, where will also be made public baths, and lakes for swimming, boating and skating — all these are admirable features among others for more extended reference than there is space for now.

The proposed acquisition of the space between Pennsylvania Avenue and B Street, now covered with buildings of a most unsightly sort and forming a district of sordid, unsanitary and immoral conditions, a region of slums, and the use of this ground as sites for a municipal building, for enlarged modern markets, for an armory, a hall of records or deposit for the Governmental archives, and for like purposes, has been long urged, and will commend itself to every traveller who may have been shocked at the present condition of this, the city's most important, avenue.

It should be noted by those who may regret the loss of Downing's Mall that in the masses of forest and park treatment appearing in the Commission's plan, upon the acquisitions south of the Mall and in the parts toward the Lincoln Memorial, there will be given back an equal or greater area less regularly planted and showing within its formal boundaries something of the picturesque, or English, style which we have been accustomed to associate with the idea of a park. And this sentiment is a thing to be reckoned with as something which comes to us through an inheritance of many generations. It was in Pope's time that an overdoing of the Italian garden and absurd exaggeration of the topiary art began to be ridiculed out of the way of the new natural school, which has since so generally held sway. The formality of this essentially academic and formal work of the Commission may not at once commend itself to people who have grown up in another tradition. This stiff-set piece of landscape-art, showing in every feature the law and order of Classic art, may cause lovers of the Romantic School a certain weariness of spirit.

The first sight of Versailles, for instance, the long straight avenues, geometric figures at every crossing of the ways, the trees in ranks, the hedges clipped to forms of stone, the vast perspective between mathematical parallels of foliage, the rococo distortion and imprisonment of nature's free grace, may bring a lonesome feeling, a yearning for the sight of the vagabond cow-path in the big woods. Mother Nature seems remote. Her sweet, intimate beauty is not here. Instead reigns a pagan god. A bust of Pan leers from the *quincunx*. Well, Nature still sits upon her proper throne, but here Art reigns of right. And so in these plans of the Commission we must let these capable artists teach us what is best. And as we study their scheme, as a whole and in detail, we must grow more and more deeply impressed with the splendidly comprehensive grasp and knowledge and refinement of taste which have gone into its invention. Their presentation of it in their report and in this exhibition of plans, sections, models, views, and bits of detail in beautiful rendering, with hundreds of enlarged photographs of examples of landscape-architecture from foreign places is, beyond words, convincing and beautiful. One hopes that means will be found to let it be seen in other centres of population, that its incalculable educational value may be felt far and wide among us. Already something toward this end has been arranged, and the exhibition goes to Chicago for a time after March 1st, and will later be seen in New York.

Finally, it is comforting to know that, so far, all projects for new public buildings coming before Congress in this session are within the lines of the Commission's plan:

A building for the use of Congress is to balance the Library at the northeast corner of the Capitol grounds. Another square in that place will be given to a building for the Supreme Court. The new Department Building of State and Justice will occupy the square bounded by Seventeenth Street, Pennsylvania Avenue, Lafayette Square and H Street. Negotiations are in progress to purchase the square on south side of Pennsylvania Avenue east of Fourteenth Street, for a Hall of Records.

It is proposed at once to remove the trees from the Capitol and Monument axis.

Thus are the essential features of the Commission's plan already being ratified by Congressional approval.

COMMON ACCIDENTS IN BUILDING.

THE following memorandum on the causes of common accidents that occur on buildings in course of construction or repair, and hints for their prevention, has been issued by the [English] Home Secretary.

In the memorandum an attempt is made to explain and illustrate those accidents the cause of which may be considered controllable by the builders and workmen. The dangerous conditions in building-operations may be divided into two classes — (*a*) Those arising from imperfect scaffolding, and (*b*) Those arising from the lifting and carrying of material.

SCAFFOLDING.

1. The two principal methods are known respectively as the North and South Country systems. The Northern, as the name indicates, is principally used in Scotland and the North of England, although of late years it has also found favor in the South; the other method (see Fig. 1) is essentially the South-country system.

2. The first method is invariably used in conjunction with power, generally a steam crane. When one crane only is necessary it is fixed upon a triangular platform built upon three legs, one at each angle, and is raised to such a height as to be well over the building to be erected. The crane stands over the principal, or king, leg. Owing to the guys it cannot make a complete revolution; if power is required that can be utilized on all parts of the building, the erection has a square platform with a leg at each angle, two cranes are then fixed, being placed diametrically opposite to each other.

3. The three or four legs, as the case may be, are of framed timber, bolted, and are weighted to the ground by masses of brickwork. The whole is so well built that accidents occurring through faults of construction are extremely rare.

4. The greatest dangers arise when the crane is imperfectly fixed, and when the weight of the crane engine and load is too much for the king-leg on which it rests, and when the legs are not sufficiently far from the king.

5. With regard to the first point, the guys of the crane should always be carried to the centre of the secondary legs, and chained down to the masses of brickwork which weight these legs at their feet. This chain requires frequent examination, especially when a

heavy load is being raised, as, owing to the vibration of the scaffold, it becomes loose, and, if not tightened, the crane would lose its rigidity, and accidents would be likely to occur.

6. In the second case where the weight is great, the king leg should have an additional centre upright running from top to bottom. (See Fig. 2, which is a plan of a king leg.)

7. The second form of scaffolding presents many points of interest. In order to render this report more intelligible, notes are given on the sketch (Fig. 1) which explain the technical terms used. There are two varieties again of this scaffold, and their use depends upon the material of which the building is being constructed — viz., either of brick or stone.

8. Where bricks are in use, one row of standards and ledgers only are necessary, the putlogs resting outwardly on the ledgers and inwardly on the wall (where header-bricks have been left out for their reception).

9. On stone buildings, and more especially when ashlar fronted and where an opening in the wall would leave a permanent disfigurement, a double set of standards, etc., are necessary to carry the putlogs. (See Fig. 3, which is a section of what is known as a mason's scaffold.)

10. A few points with regard to these erections.

11. The different marryings, tyings, etc., should be carefully watched, as scaffolds have been known to come down owing to the cords slipping. This happens more especially when cords have been used damp, the influence of a hot sun causing them to relax considerably. Wedge-driving between cords and posts is the usual method of tightening.

12. The boards on which the men work should be carefully kept in position. Figure 4 shows the usual position of the boards. Carelessness may, and does, result in these losing their place, and if by so doing they take the position shown on Figure 5, what is known as a trap is formed. Figure 6 illustrates the working of a trap. It will be noticed that when on the boards it is not easy to tell where the putlogs are. This creates to a large extent the danger. A certain preventive would be for the putlogs to be used in pairs; the boards then, instead of overlapping, could be placed end to end (see Fig. 7); in overlapping, boards get out of place, and a second man of two may catch his toe against the end raised.

13. Two of the commonest forms of accidents occur on these scaffolds, the falling of workmen and the dropping of the material from the upper floors of the erection. On the outside of the scaffold, also at the ends, a guard-rail should be lashed to the standards about 3 feet 6 inches above the scaffold-boards. This would obviate the first danger. With regard to the second, the danger from falling material is much to be deplored, as, though it can occur in many ways, it is, as a rule, the result of great carelessness. A board on edge running along the outside of the scaffold, but within the uprights and nailed to them, and again at the ends, would, to a great extent, prevent this class of accidents. Unfortunately, this board cannot be fixed on the inward side of the scaffold, as it would interfere with the free use of the workmen's tools. Figures 1 and 3 show the guard-rail and board on edge.

14. A mason's scaffold should be supported in such a manner that no opportunity could occur for it to fall away from the building. Figure 3 shows the shoring which is the usual method of preventing this where room permits — but this cannot be applied in a street, and in that case the scaffold should be tied to the inside of the buildings by poles through the openings.

15. There are other conditions of risk involved in insufficient width of runs, and in the use of centring improperly supported. A run is commonly seen only one board wide (9 inches). It is needless to say that this width is dangerous; 18 inches is the least that should be allowed. A run for continued use would be better made of two 3″ x 11″ planks if two planks are used. A slip of wood can be nailed across the undersides to keep them together. Figure 8 is a plan of a working-platform surrounding a courtyard or well, and gives three examples of runs which are commonly used, but which are not satisfactory.

16. Improperly supported centring is seen only in cheap work. Figures 9 and 10 give an example of what is meant. It will be noticed that the supports to the centring of Figure 9 are kept in their position entirely by the lateral pressure exerted by the stay *A*. It follows that if this pressure is eased sufficiently, say by shrinkage, it is more than probable that the centring and a large portion of the unfinished arch would fall. Figure 10 shows the centring properly supported. All supports to centring should rise from a solid foundation.

16*a*. Painters' boats occasionally fall owing to the use of defective cordage and supports. Care is the only remedy that can be suggested.

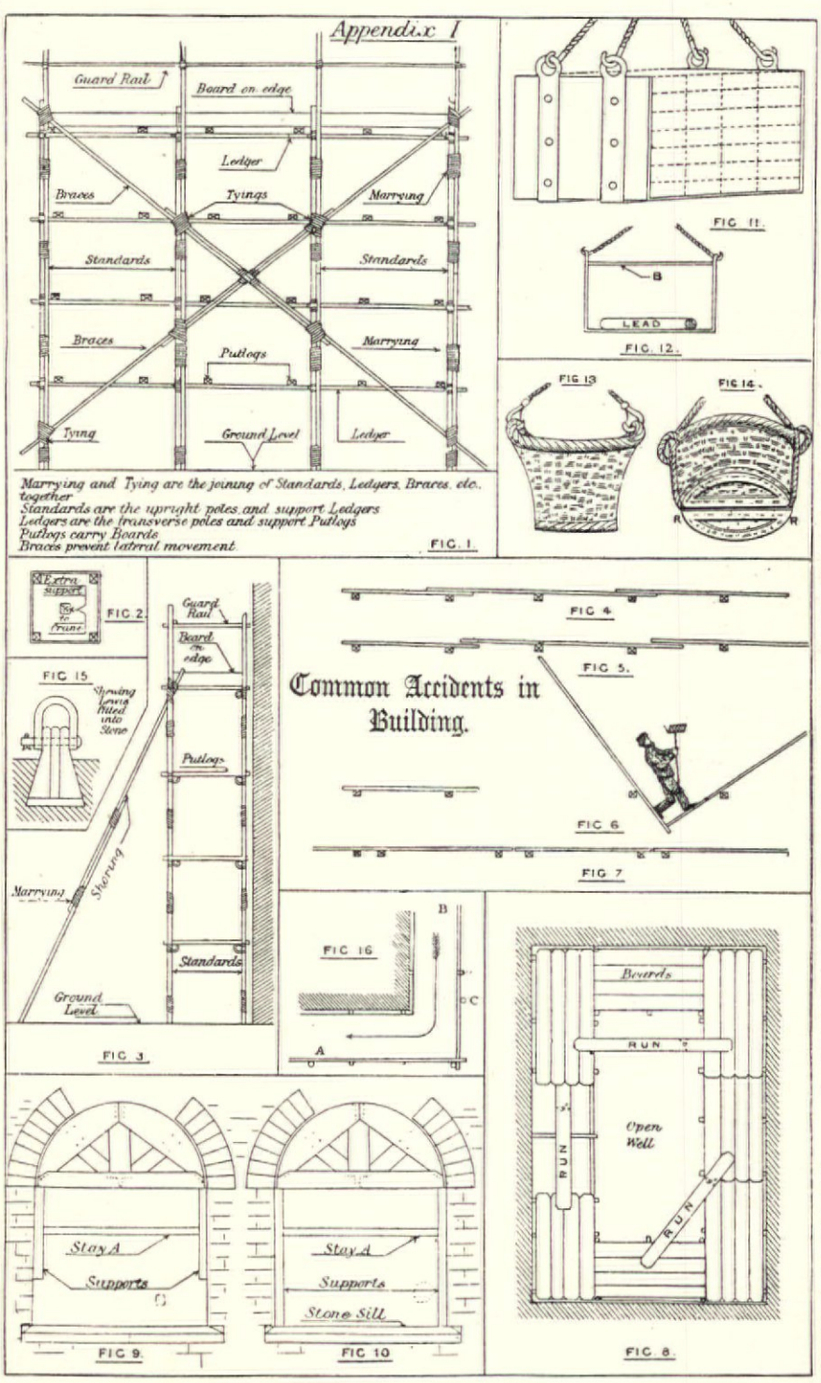
16*b*. Gantries, especially those erected over the public way, having to carry great weights, should be effectively strutted and braced, and timber of sufficient strength used.

THE LIFTING AND CARRYING OF MATERIAL.

17. Very little danger arises during the lifting and carrying of material so far as the power in use is concerned. The accidents generally occur owing to the defective manner by which the material is secured to the crane, pulley-wheels, or whatever the arrangement for lifting may be.

IRONWORK.

18. Ironwork is principally used in the form of girders or columns. They are sometimes slung by a chain round the middle and as evenly balanced as may be. There is considerable danger of this chain slipping, however well balanced (more especially if the load when swinging is tilted, say by receiving a jar through touching some part of the erection) and thus allowing the material to fall. To prevent this a second chain may be run from each end of the column or girder to a point some distance up the supporting chain; but the best remedy is a "softener" — *i. e.*, an old bag or sack put round the ironwork first, and the chain turned twice round it over the



"softener" and knocked as close as possible; then no slipping will take place.

The same applies to timber.

TIMBER.

19. Timber in lengths can be carried in the same manner as the iron girders, but owing to the greater friction set up between wood and iron, it is not so likely to slip as the former. The same precautions, however, are necessary.

BRICKS, SLATES, ETC.

20. Bricks, slates, etc., in large quantities are slung in crates, in smaller quantities in baskets, and in small work are carried in hods by laborers.

21. The crates (Fig. 11) will carry as many as 350 bricks. It will be noticed that they are not fitted with sides. This is to facilitate loading. The chief danger arises from their use when they are improperly packed. When suspended the pull on the handles causes the ends to take an inward slope. If the crate is tightly packed this pull creates a pressure on the material, and tends to keep it in position; but if loosely packed, the absence of sides would be a source of danger, as the material could easily fall out.

22. If a similar crate was used to carry a roll of lead, it would be necessary to place a stay (*B*, Fig. 12) across the top, to counteract and relieve the strain at the bottom.

23. When baskets are used, the danger lies in the handles. If they are hooked to chains, which is the usual method (Fig. 13), the weight may, and does, cause them to give way. One remedy is for the chain or rope to be carried round the basket, as shown in Figure 14. The pieces of wood marked *R*, if fixed as shown, would give the basket a level bottom, and would also tend to prevent the rope slipping. A better course would be so to construct the basket that the material of which the handles are made should be carried down the sides and along the bottom of the baskets, and well secured thereto. In any case care should be taken to see that the baskets are strong enough in the first instance, kept in proper repair, and not overloaded, and that spring hooks be used on the slings.

STONE.

24. There are several methods of lifting stone. It can be lifted in the same manner as ironwork, or may be suspended by means of a "lewis," or, again, by means of nippers.

25. The first method is perhaps the safest, but is generally used for undressed work only, as the chain is apt to break up any finished edges, etc.

26. The second method — by a lewis. A hole is cut into the stone wider at the bottom than at the top, three pieces of iron, as shown in Figure 15, are fitted into it, the outside, or splayed, pieces first, and the rectangular centre-piece last. A bolt running through the top of each fixes its position, and at the same time secures a ring into which the hook by which it is to be lifted is placed. This arrangement will lift a very great weight. They are made in all sizes to suit; the softer the stone the deeper they ought to be in proportion to the weight. The risk of its giving way if the stone is not free from vents, or when the lewis does not fit the hole, or, again, if the weight is not evenly distributed, is considerable. Its use with perfect safety can only be left to the judgment of the mason.

27. The nippers clutch the stone on the outside. Danger may arise if the small holes picked out to receive the nippers are so near the top edges of the stone that the points drag out; or again, the centre of gravity may be above the points, causing the stone to turn over and fall.

28. It is, of course, assumed that the plant in use has been, both in point of quantity and quality (and the first is of equal importance with the second), fully sufficient. It is regrettable that often in actual practice this has been found not to be so. Inferior tackle has been, and is, responsible for many accidents. Many lives, again, could have been saved if a little forethought had been used, and compliance made with those unwritten rules by which workmen should be guided. Figure 16 will give a clear illustration of what is meant. A laborer, in building a scaffold, required a ledger at point *A*. He fetched it from point *B*. He carried it upon his right shoulder, and in turning the corner in the direction of the arrow, the end of the pole struck against standard *C*. The recoil immediately knocked him off the scaffold. If the pole had been upon his left shoulder the blow would have fallen harmlessly, and his life would not have been lost.

The following suggestions, if carried out, would tend materially to reduce the number of accidents occurring on buildings in course of construction or repair: —

(1) All working-platforms above the height of 10 feet, taken from the adjacent ground-level, should, before employment takes place thereon, be provided throughout their entire length on the outside and at their ends —

(*a*) With a guard-rail fixed at a height of 3 feet 6 inches above the scaffold-boards. Openings may be left for workmen to land from the ladders, and for the landing of material.

(*b*) With boards fixed so that their bottom edges are resting on or abutting to the scaffold-boards. The boards so fixed should rise above the working-platform not less than 7 inches. Openings may be left for the landing of the workmen from the ladders.

(2) All "runs" or similar means of communication between different portions of a scaffold or building should be not less than 18 inches wide. If composed of two or more boards they should be fastened together in such a manner as to prevent unequal sagging.

(3) Scaffold-boards forming part of a working-platform should be supported at each end by a putlog, and should not project more than 6 inches beyond it unless lapped by another board, which should rest partly on or over the same putlog and partly upon putlogs other than those upon which the supported board rests.

In such cases where the scaffold-boards rest upon brackets, the foregoing suggestion should read as if the word "bracket" replaced the word "putlog."

N. B. — Experiments have shown that a board with not more than a 6-inch projection over a putlog can be considered safe from trapping or tilting.

(4) All supports to centring should be carried from a solid foundation.

(5) In places where the scaffolding has been sublet to a contractor, the employer should satisfy himself, before allowing work to proceed thereon, that the foregoing suggestions have been complied with, and that the material used in the construction of the scaffold is sound.

ARTISTS' PROTEST AGAINST THE TARIFF.

THERE are many reasons why the present time seems particularly opportune for a renewal of the movement for a repeal of the tariff on works of art. Probably there has never been so general an interest in the subject throughout the country as has been aroused by the recent purchase of great masterpieces of the world's art by several Americans of great wealth and liberality. While the Government of Italy has placed every legal obstacle in the way of the sale and exportation of the artistic treasures of its citizens, realizing that its works of art are one of the most valuable assets of the country, our own Government strives to render the importation of these same works of art difficult or impossible, and with such a measure of success that many great works actually owned by American citizens are retained abroad because the tax on their importation is too heavy to be willingly borne. At a time when the United States is the richest and one of the most powerful countries in the world, when a growing taste leads us increasingly to desire those things of beauty which our wealth enables us to command, and when financial embarrassment in many countries of the Old World is placing upon the market art treasures which a few years ago could not have been purchased at any price, why should our Government alone among those of civilized peoples treat art as a luxury, the indulgence in which must be penalized?

It can only be as a luxury that art is taxed, for with our overflowing treasury, necessitating the immediate reduction of taxation, the comparative small revenue arising from the tariff on works of art could readily be spared; while the repeated and continuous efforts of the artists of this country to secure the abolition of that tariff show better than could anything else the absurdity of considering that a protective tax which its supposed beneficiaries are most desirous of abolishing. Yet, it seems scarcely necessary to argue at this day against that view which considers as a mere "luxury" one of the greatest of civilizing forces and one of the most permanent forms of wealth, and to point out that no one consumes works of art, but that they remain in the country, ultimately devolving by gift, bequest or purchase to museums or other public institutions, where, as the property of the people, they diffuse education and culture forever.

In common with all other people of taste and refinement, the artists of the United States are opposed to this tax on civilization. Through an organization formed for that purpose they advocated its abolition for years, and secured, first, a reduction of one-half, and then its entire removal. In the Dingley tariff, however, the tax on works of art was reimposed, and in a worse form than ever, for the new tax made no exception of "antiquities," under which name the works of the old masters were formerly admitted free of duty. We believe that American artists ask and need no protection, and we would willingly see the total abolition of any tax whatever upon the importation of works of art. Certainly we not only need no protection against the works of the old masters, but we need those works, and heartily desire bringing into this country as many such as can be procured. We can see no possible interest that could be harmed, and many that could be helped, by the placing upon the free list of all works of art created fifty years before the date of importation, and we hope that at least so much freedom of importation may be granted.

As the National Free Art League was dissolved, after apparently accomplishing its purpose, the artists of the country can act only through their regular organizations. We therefore purpose to bring the matter of the tariff upon works of art once more before the various art-societies of New York, and ultimately before the Fine Arts Federation, in the hope that Congress will be induced to abolish or modify the present tax.

J. Carroll Beckwith,
Kenyon Cox,
William M. Chase,
Edwin H. Bashfield,
William A. Coffin,
Frederick Dielman,
J. G. Brown,
John La Farge,
Thomas Eakins,
F. P. Vinton,
J. Alden Weir,
Frederick W. Kost,
C. E. Cookman,
Childe Hassam,
John W. Alexander,
Edwin A. Abbey,
H. Siddons Mowbray.

They do not do Things better in Italy. — Palermo has a fine new theatre. The estimated cost was 2,450,000 francs; the real cost was 7,000,000. — *Exchange.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ST. PETER'S R. C. CHURCH, COLUMBIA, S. C. MR. GEORGE A. LOVATT, ARCHITECT, PHILADELPHIA, PA.

PRELIMINARY STUDY FOR THE SAME.

UNITED STATES CUSTOM-HOUSE, BALTIMORE, MD. MESSRS. HORNBLOWER & MARSHALL, ARCHITECTS, WASHINGTON, D. C. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

CLUB-HOUSE OF THE A. D. CLUB, CAMBRIDGE, MASS. MESSRS. PARKER & THOMAS, ARCHITECTS, BOSTON, MASS.

[The following named illustration may be found by reference to our advertising pages.]

MARQUETRY PANELS FOR THE S.S. "ORONTES." DESIGNED BY MR. STEPHEN WEBB.

THIS plate is copied from the *Architect*.

[Additional illustrations in the International Edition.]

MEMBERS' ENTRANCE: A. D. CLUB, CAMBRIDGE, MASS. MESSRS. PARKER & THOMAS, ARCHITECTS, BOSTON, MASS.

STORE ENTRANCE: A. D. CLUB BUILDING, CAMBRIDGE, MASS.

THE IMPERIAL POST-OFFICE, BERLIN, PRUSSIA.

THE IMPERIAL MUSEUM, CONSTANTINOPLE, TURKEY.

MODELS FOR THE WASHINGTON IMPROVEMENT SCHEME.

TREATMENT OF THE WHITE HOUSE LOT, WASHINGTON, D. C.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE NUMBER OF THE ARCHITECTS TO BE ELIGIBLE FOR NEW YORK MUNICIPAL WORK.

NEW YORK, N. Y., February 25, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In your editorial reference to the bill "to facilitate the selection of competent architects for municipal work in the city of New York," in your issue of February 22, one point of great importance has been overlooked. There is no intention to limit the "eligible list" to 100. This is merely a limit beyond which the Fine-Arts Federation are not compelled to furnish names to the Mayor.

It seemed necessary, as a matter of public policy, to give the Mayor power to keep the "eligible list" filled up to the limit of 100 even if the Federation for any reason should fail to act. Beyond that point it seemed desirable that the Mayor should not have this power unless the Federation did present him lists of names from which to appoint, for very great care would be necessary in the choice of architects after such a list of 100 had been named, and there might be years when the Federation would not feel inclined to furnish any names whatever. It is, however, intended to make the list just as large as possible, so that eventually it will include all the men of reputation in this country.

We have great hopes that this list will eventually become a roll of honor, and that, as all the younger members of the profession will desire to be placed on this list, it will furnish an additional incentive to them to avoid questionable practices and will thus tend on the whole to raise the *morale* of the profession at large.

Yours very truly, HENRY R. MARSHALL, *President*.

NOTES & CLIPPINGS

THE FOUNDRY CHURCH, WASHINGTON, D. C. — One of the oldest houses of worship in Washington, the Foundry Church, which more than one Methodist President has attended, is about to be torn down to make room for a modern office-building. The property has been bought by Thomas F. Walsh, the rich Colorado miner. As the story goes, he happened in at a fair which was given to raise money for the uses of the congregation. He bought almost everything in sight at the prices asked, and then looked about for something more to purchase. There was nothing but the meeting-house, and the lot on which it stood; it had long waited for a purchaser with a full purse, for the site on the corner of Fourteenth and G Streets is in a good neighborhood for business purposes. One of the trustees told Mr. Walsh he could have it for $200,000 cash. It required a few days to perfect the transfer, but recently the deed was put on record, and the price stated at $203,778. The building was erected by an old Scotchman shortly after the capital was invaded and burned by the British in 1814. He owned a foundry in Georgetown, about two miles distant. He had made guns for use in the war, and when the enemy arrived he supposed his foundry would be the first thing wiped out. But the British were so intent upon looting the White House and other official buildings, and in such haste to get away from hostile reinforcements, which existed only in their imagination, that they quite overlooked the iron-foundry. When the proprietor returned with the rest of the panic-striken populace, he was so amazed to find his property intact and himself still rich, instead of ruined, that he attributed it to the special intervention of Providence, and at once voted to repay the Lord with a fine Methodist meeting-house. This he did; and hence the name — the Foundry Church. — *N. Y. Evening Post.*

CHURCH HYGIENE. — In view of the remarks recently published in our columns on the relation of the Church to sanitation, some information appearing in a French journal is not without interest. It seems that the Italian Bishop of Fano has sent out a circular to the priests of his diocese directing that in all churches immediately after feast-days on which there have been very large congregations the floors must be disinfected by means of wood sawdust soaked in a one-tenth per cent solution of corrosive-sublimate. On ordinary days they must be frequently swept, after sprinkling them with water so as to raise no dust, It is further directed that every week, and even oftener, the pews and confessionals must be cleaned with sponges and cloths moistened with pure water, and that every week, and oftener if necessary, the grilles of the confessionals are to be washed and polished, while the holy water receptacles must be emptied every week, or oftener if necessary, and washed with hot water or a solution of corrosive-sublimate. In order that these provisions may be carried out, the Bishop has instituted a service of inspection, and requires the payment of fines into the diocesan treasury for transgression of any of these hygienic rules. The journal responsible for the foregoing expresses the hope that the Bishop of Fano's example will be imitated by Church authorities in other countries. — *Sanitary Record and Journal.*

AN ANCIENT BILLIARD-TABLE. — There is a billiard-table in London at the present moment that can boast of a life-time of two centuries and a long acquaintance with men who have made history. It belonged originally to Louis XIV, passed into the possession of Napoleon I, and now, in its old age, is on exhibition in Soho Square. This celebrated table is smaller than an English table. The body of the table is a block of oak, weighing ten hundredweight, covered with a cloth of electric-blue. The frame of the table is of rosewood, and the six pockets — perhaps the most striking feature of the table — are reproductions in bronze of queer hideous old gargoyles. When the ball falls into the pocket, the lower jaw of the gargoyle drops, and the ball is found in its mouth. It is a clever piece of old mechanism. — *Liverpool Post.*

PROPOSED MONUMENT TO DANTE AT ROME. — The Rome correspondent of the *Pall Mall Gazette* sends this interesting item: "The munificent gift of a monument of Goethe by the Emperor William to Rome has aroused different sentiments in the breasts of Italians, gratitude, and shame that their own greatest poet should have been unrepresented in the capital of the Kingdom. There was a serious project to raise a monument to Dante, but King Humbert's death interfered with the project, which is now revived. By the irony of fate the movement is led by a Clerical. Dante, besides being the father of the Italian language, was the incarnation of the Ghibelline idea, as opposed to the Guelf, or Clerical. Now, to the stupefaction of all, a strong Clerical in the Municipal Council has risen and proposed that Rome erect a monument to Italy's greatest son."

A THREE-WAY BRIDGE AT ZANESVILLE, O. — A unique three-way stone bridge, now building at Zanesville, O., is attracting the attention of a wide circle of engineers. The city is on three river-banks, where the Licking runs into the Muskingum. The new bridge connects the three sections. It is in three parts, each extending from one of the banks of the river to a big three-sided central pier in the middle of the river. The bridge is for the traffic — street-car, wagon and foot — of the population of some 28,000, hence the amount of traffic that passes over the structure is large. All the trolley-car systems of the city are connected with the bridge, and there are double tracks over it. At the centre of the bridge is an arrangement of switches that makes it possible for a car going on to the bridge from either direction to leave it by either of the other arms. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, MARCH 15, 1902 No. 1368

CONTENTS.

SUMMARY: —
The Protection of Hotel Guests from Fire. — Rejection of a Concrete-and-Iron Hanging Spiral Staircase.—The Teamsters' Strike in Boston. — Part IX of "*The Georgian Period.*" — M. Sandier and the proposed Porcelain Tower at St. Cloud. — International Congress of Workingmen's Dwellings. . . 81
NOTES ON IRON AND STEEL CONSTRUCTION. — V. 83
MODERN OFFICE-BUILDINGS. 86
A CONCRETE COURT-HOUSE. 87
ILLUSTRATIONS: —
Design for a proposed Church in the Suburbs of Boston, Mass.: Two Plates. — Northwest View of the House of Mrs. L. L. Swann, Stockbridge, Mass.
The Bassin du Dragon, Versailles, France; — Harde de Cerfs, Garden of the Luxembourg, Paris, France.
Additional: House of Mrs. L. L. Swann, Stockbridge, Mass. — The Phillips Congregational Church, Exeter, N. H. — East Front of the same Church. — A Doorway of the Grand Palais, Paris, France; — The Tuileries: Entrance to the Ministry of the Colonies. — Vestibule: Château de Chantilly, France; — The Grand Stairway: The Sorbonne, Paris, France. — The Mauritshuis, The Hague, Holland. — The Church of S. Giustina, Padua, Italy. 87
NOTES AND CLIPPINGS. 87

TWO serious fires have occurred within a short time in hotels, and the question of protecting hotel guests has, in consequence, come up again for discussion in the newspapers. In the case of the Park Avenue Hotel, which was built, thirty years ago, for a fireproof structure, and was well supplied with brick partition walls, the fatal defect seems to have been in the windows. Those on the side toward Park Avenue gave way immediately before the flames blown across the street from the burning armory building on the other corner, and the curtains, furniture and woodwork were soon in a blaze. The windows opening on the interior court were, in their turn, quickly destroyed, on both sides, spreading the fire all over the building, although the floors were of masonry, and a fire originating, let us say, in the basement of the hotel would have had great difficulty in extending beyond the room in which it originated.

THIS has been the history of so many destructive conflagrations, particularly those in buildings intended to be fireproof, that experts have long agreed that no structure in a closely-built city can be considered even approximately secure against fire, so long as it is provided only with ordinary windows. Shutters, of iron, or of wood covered with tin, will protect windows if they are used; but, in practice, such shutters are out of the question for a hotel, and the only resource available in their place is the use of wired glass. That such glass, if set in metal sashes, and these in metal frames, will keep out fire as effectually as ordinary shutters, has been many times demonstrated, and, if it were not for its unattractive appearance, and its disposition to crack over the wires, the wired glass would be used very extensively, on the advice of architects. The latter, however, are obliged to consult the wishes of their clients in regard to the appearance of their buildings, as well as in regard to its security from fire, and clients who are satisfied with a network of chicken fencing in their front windows, diversified with cracks and bubbles, are rare. Nevertheless, the protection which it affords is so valuable that, if means could be found for making it even tolerably ornamental, its use would be greatly extended; and it does not seem impossible that such means might be found. Some of the glass set in small pieces in copper bars is extremely pretty, besides being nearly as fireproof as the wired glass; and, if manufacturers were disposed to take up the matter, there are plenty of architects who could furnish designs for imbedding in the melted glass an ornamental pattern in wire. In this, or some similar way, using also metal-covered doors and metal trim, hotels could be made really fireproof; and it does not seem unreasonable to suggest that the next amendment to the Building Laws might well take the form of a prohibition of the use of wooden window frames or sashes, or of glass in pieces of more than nine square inches, in any outside or courtyard wall of any hotel. That there would be resistance to such an enactment from the proprietors of stores on the street floors of hotels, and, possibly, from hotel landlords and their guests, is certain; but the latter would soon become accustomed to the change, and would probably find æsthetic attraction, as well as consciousness of safety, in the subdivided glass, and the objections of the former should not be considered in comparison with the safety of the hotel guests whose lives are imperilled by every sheet of plate glass in the building to which they entrust themselves.

A CASE heard in London, on appeal from the decision of a District Surveyor, has a considerable technical interest. Every one has heard of the Rowton Houses in London, where poor people are lodged and fed at a cheap rate, very much as they are in the Mills Hotels in New York. The architect of one of the houses, now in process of erection, designed a geometrical staircase, consisting of steps and landings of artificial stone, made with a core of "breeze" and Portland cement, surrounded with a finishing layer of cement and sand, and containing iron angle-bars, or, rather, bedstead-irons, in each step, the steps and landings being wedged into the wall at one end, but unsupported at the other, except that each step was notched on the one below. The District Surveyor objected to this construction, and directed that a steel or iron string should be put under the outer end of the steps, and a beam under the landings. This order was not obeyed, and, on his rejecting the staircase, an appeal was taken, as provided by the law. The Tribunal of Appeal is composed of experts in construction, and, after hearing a great deal of evidence on both sides, unanimously decided that the staircase was defective, and that the order of the District Surveyor should be carried out.

THE reasons given for this decision are instructive. The Tribunal was of opinion that a staircase of the same form, if made with concrete of uniform quality, would be safe; but the combination of a core of the soft and unreliable coke-breeze with an outer shell of hard concrete, of granite chips and cement, they thought likely to cause cracks, through the unequal shrinkage of the two kinds of material, and it appeared that in other staircases, built in the same way, transverse cracks had already shown themselves. The angle-irons were considered by the Tribunal to be of very doubtful value. The architect thought that the concrete adhered perfectly to them, although, instead of new angle-irons, old bed-irons, which had once been japanned, were used; but the Tribunal believed that the tendency of such irons to start a seam in the concrete in the direction of their surfaces was a source of danger, and that wires were to be preferred. A calculation of the strains and resistances of the steps was made, regarding the steps as independent cantilevers, from which it appeared that, when covered with a crowd of people, the tensile strain on the upper part of the step would be one hundred and eighty pounds per square inch, while the safe resistance of the concrete would be only one hundred pounds to the square inch. We should ourselves think one hundred pounds per square inch much too large an estimate of the safe resistance of concrete made with such a miserable material as coke-breeze; but, on the other hand, it is rather absurd to calculate a geometrical staircase, each step of which rests for its whole length on the step below, as a succession of independent cantilevers. However, the Tribunal, on inspecting the staircase in question, after a test had been made by loading it with brick to an extent only a little greater than the actual weight of a crowd, found that one of the joints between a step and a landing had opened throughout its whole length, probably through the crushing of the soft interior mass under the combined effect of the dead weight and the torsional strain, and its conclusion, that the margin of safety allowed was insufficient, seems to have been justified.

IT is fair to say that the investigation, although it resulted in the rejection of the architect's appeal, cast no discredit on him. The District Surveyor and the Tribunal concurred in praising warmly the work in general, and the question in regard to the stairs was simply a difference of opinion between two experts, carried to other experts for decision. The District Surveyor, Mr. Crow, in particular, showed not only thorough knowledge and excellent judgment in the matter, but a courtesy to his brother-architect which deserves commendation. Although he believed, on theoretical grounds, that the stairs, which were four and one-half feet wide, were unsafe, he went with the architect to see similar stairs, built in another district; and it was not until they had both found in these open joints between the steps and the landings that he gave notice that in

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

the new building he should require the outer ends of the steps to be supported.

ONE of the most unprovoked and malicious strikes of recent years has been in progress in Boston this week, but is now thought to be settled and declared "off." The source of the trouble is to be found simply in a demand made, some weeks ago, upon a large transportation company, which has many offices throughout the country, that it should refuse to accept for transportation goods made by non-union workmen. The officers of the transportation company replied that, while in all other points they were ready to accept the terms of the teamsters' union, they could not comply with this demand, for the reason that they were under contract with shippers of merchandise all over the country to receive and transport goods offered them, and they could not refuse such goods without a violation of their contracts which would involve them in ruinous suits for damages. This explanation would seem satisfactory to reasonable persons, but the agitators chose to reject it, and declared a strike against the transportation company. This strike was a failure, the company easily finding new men to drive its teams, while the Boston police showed admirable efficiency in suppressing the attempts of the strikers to assault the new men. As might have been expected, the leaders of the demonstration saw at once how the newly constituted civic conferences and conciliation committees could be utilized to advertise them, and telegrams, signed with their distinguished names, and addressed to Senator Hanna and other prominent persons, were duly communicated to the newspapers. The Secretary of the conciliation committee even came to Boston, but, after examining the affair, discreetly went back again.

AFTER a week or two of silent preparation, the "strike committee" executed its next manœuvre, which consisted in ordering all freight-handlers, railway-men, teamsters and others to refuse to unload, handle or touch any merchandise brought or offered to them by the offending transportation company. As was undoubtedly expected, the railway freight-handlers who first obeyed the order were immediately discharged, and a general strike of all teamsters and freight-handlers was ordered, to compel the railway-companies to reinstate them. It is fair to the employés of the railways to say that they obeyed the order to strike unwillingly and reluctantly, but the terrors which the union despots are enabled, mainly through the cowardly truckling of politicians, to hold over workingmen prevailed over the natural loyalty of railway servants to their road, and the strike soon affected all the railroad freight-yards in the city. The President of one of the roads gave his men three days to return to work or be discharged, and had the satisfaction of seeing them come back rapidly, and it is probable that the railways suffered very little by the demonstration; but, as is usual in such cases, and as was undoubtedly foreseen, multitudes of innocent and peaceable people were put to annoyance and expense. As the drivers of coal-wagons joined the strike, little or no coal could be delivered, and some small manufactories, to say nothing of the elevators in some buildings, had to suspend operation. In the same way, as materials could not be delivered, building-operations in the city were stopped, and many mechanics were thrown out of work. As is well known, building workmen in Boston never strike, their differences with their employers, when they have any, being settled by a committee of arbitration, so that their enforced participation in a contest in which they have not the smallest concern was particularly vexatious. That the strike must ultimately fail was evident, not only on account of the preposterous nature of the demand on which it was based, but because of the ease with which new men could be found to take up the simple and well-paid duties of freight-handling; and it may be hoped that the people of Boston, who are not so easily deluded in regard to labor matters as they were a decade ago, will take the opportunity to record emphatically their opinion of the desperate attempts which labor agitators have been making for the past two or three years, to shut out from all markets, and from all lines of transportation, merchandise not bearing the union stamp; that is, to reduce all American industry to slavery under the meanest, most cruel and most corrupt tyrants that ever cursed mankind.

A COMPOSITOR'S unfortunate blunder in our last issue must have given the impression that, like Tennyson's brook, our publication of "*The Georgian Period*" was to "go on forever." We will try to correct this impression by declaring that the Part that was published last week is the first Part of the third and final Volume, not, as was printed, "the first Part of five Volumes."

WE suppose that it must be the same Alexandre Sandier, well-known and beloved of many New York architects of the elder generation, who is now at the head of the national porcelain manufactory of Sèvres, and his friends in this country will be interested to hear of the porcelain tower which he proposes to erect in the park of Saint-Cloud, on the site of the "Lantern of Diogenes," which stood in the park until the destruction of the palace by the Germans in 1871. The tower is to be twenty-six feet in diameter and about one hundred and fifty feet high, and is to be entirely covered with decorated porcelain, representing the legends of the Forest of Saint-Cloud, with borders and ornaments taken from the animal and vegetable life of the region. The general ground color is to be white, or nearly so, the decorations being in their natural tints. Those who know M. Sandier's reputation as an artist will be impatient to see this remarkable work completed; but, as thirty thousand pieces of porcelain will be required, and the furnaces of the manufactory can contain only a limited number, it will be at least five years before the materials will be ready. In 1907, however, the Director hopes to be able to begin the work of construction, and the neighborhood of Paris will then be enriched with what is sure to be one of the most beautiful, as well as one of the most curious, of modern monuments.

IT is not impossible that this new undertaking, coming so soon after the extensive use of decorated earthenware in the front of the large Palace of Fine-Arts in 1900, indicates a renewed movement in France toward the use of colored materials in architecture which is of great significance. Since Garnier's well-studied, but rather timid attempt at polychromy with colored marbles in the front of the Opéra, little use has been made of color as an architectural resource in France, except in connection with restaurants or theatres. The polychromatic treatment of the latter has not, as a rule, been very successful, and the decision of the architects of so monumental a building as the large Fine-Art Palace to introduce a frieze in colored porcelain as a background for the capitals of their colonnade was received by the profession with many misgivings. The result, however, amply justified the innovation, and there was, perhaps, no architectural detail in the Exposition so interesting, as a suggestion of possibilities in the way of heightening and extending architectural expression, as the soft, pinkish band of decoration behind the upper portion of the colonnade, so little detached in color from the general tone of the wall that many people never noticed it until it was pointed out to them, yet giving a relief to the beautiful shafts and capitals, and, particularly at a distance, a certain mysterious charm to the effect of the colonnade, which must have struck all architects as affording a promise of new and lovely effects for artists capable of dealing with them. This frieze, we believe, came from the Muller manufactory, and if the Sèvres porcelain is as successfully applied to architecture, which M. Sandier's skill renders more than probable, the architects of the next decade will have a new field open to them.

THE Sixth International Congress of Workingmen's Dwellings will be held in Düsseldorf, beginning June 15, 1902, and continuing five days. The subjects to be considered are the influence of value of land, cost of construction and taxes upon rents; mutual assistance among those in need of dwellings, in the form of coöperative building societies and similar associations; and the effects of the intervention of the public authority in promoting the construction of such dwellings. The members of the Congress will make excursions to the great Krupp Colony, at Essen; to the houses of the Aders fund, and the Society for Savings, at Düsseldorf; and to similar groups at Munich, Cologne and Runscheid. The Secretary of the Committee of Organization, to whom communications should be addressed, is Professor Dr. H. Albrecht, Gross-Lichterfelde, Schillerstrasse, 11, Berlin. The subscription is ten marks, which should be sent to the Kasse A, Deutsche Bank, Manerstrasse, 29-32, Berlin, West. Inquiries in regard to accommodations in Düsseldorf during the time of the Congress may be addressed to Hugo Stangen, Unter den Linden, 39, Berlin, N. W. It is provided, very thoughtfully, that workingmen who are directors or inspectors in any workingmen's building society of general interest, if their application is made to the Secretary before June 15, may be relieved from payment of the subscription.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — V.

IN designing plate-girders there are several dimensions that must be decided by careful calculations, and there are likewise one or two details which must be carefully observed and analyzed. The span of the girder is fixed by the plan of the building, and to a certain extent the depth is likewise limited by the elevations. The depth of a plate-girder, however, should never be less than one-twentieth of the span, and when it is absolutely necessary to make the depth less than the minimum of one-twentieth, the deflection of the girder under the load should be figured, and if it is found excessive, the unit fibre-stress should be diminished by increasing the flange-area.

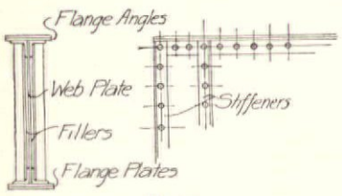


Fig. 25.

The structural features of a plate-girder are the upper and lower flanges, or chords, as they would be called if the web were built up of structural members instead of a solid plate, and the web-plate, all of which is clearly designated in Figure 25. The flanges are essentially the members that resist the bending-stress, while the web-plate is the member that resists the shear due to the loads, and thus transmits the stress from the top and lower flanges. Since the web-plate is responsible for the shear, and as economical consideration in the manufacture of the plate-girder prohibits making this member of different thicknesses of plates throughout its length, the plate must be proportioned for the maximum shearing-stress. The maximum shearing-stress in any simple beam is always at the points of support, or abutments, and is, consequently, equal to the greatest reaction at the ends of the girder; the greatest reaction being the vertical shearing-force acting through the web-plate, it is necessary to obtain enough metal in the section of the plate to resist the shearing-force to which it is subjected. The width

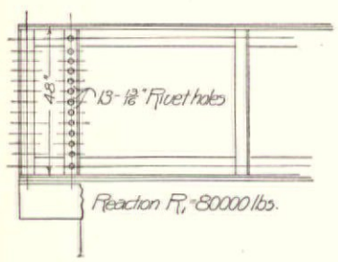


Fig. 26.

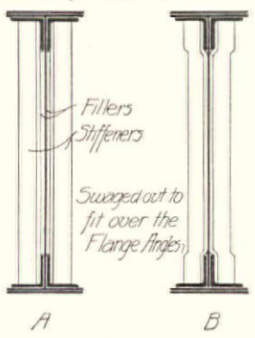


Fig. 27.

of the web-plate having been assumed, it is necessary, in order to obtain its net sectional area, to deduct all of the rivet-holes in a straight line through the end of the plate. The net sectional area cannot be found directly because the thickness is, as yet, undetermined, but the net depth may readily be determined by deducting from the width of the web-plate the product of the diameter of the rivet-holes by the number in the straight line. If this net depth is then multiplied by the safe unit shearing-stress of structural steel, usually taken at 12,000 pounds, the strength of the web-plate, if made 1 inch in thickness, is obtained. When this result is divided into the amount of the greatest reaction, or greatest vertical shear, the thickness of the web-plate required for the particular case will be determined. This can be readily stated in simple formula as follows: $t = \frac{R}{D - (d\,n)\,s}$, in which t equals the thickness of the web-plate to be determined, D equals the depth of the web-plate in inches, d equals the diameter of the rivet-holes, n the number of holes in a straight line, while s equals the safe unit shearing-stress of the metal, usually taken at 12,000 pounds, and R equals the greatest reaction, or the greatest vertical shear upon the girder. The results of this formula can, however, only be used when the required thickness is found to be at least $\frac{5}{16}$ inch, for thinner plates than this have been found, in time, to wear oval at the rivet-holes, and be subjected to buckling, which it was impossible to avoid.

Example. — The details of construction at the end of a plate-girder are shown in Figure 26, and it is desired to find the thickness of the web-plate.

Solution. — From the formula as previously given

$$t = \frac{R}{D - (d\,n)\,s}$$

and in this case D equals 48 inches, $d\,n$ (equals $\frac{13}{16}'' \times 13$) equals 10.56, s, as shown, equals 12,000, and R, as seen from the figure, amounts to 80,000 pounds. By substituting these values in the formula, $t = \frac{80{,}000}{(48 - 10.56) \times 12{,}000} = .18$ inch, or the theoretical thickness of the web-plate. This dimension being less than $\frac{5}{16}$ inch, the web-plate, for practical reasons before mentioned, must be made the minimum allowable thickness. The web-plate, owing to its extreme thinness and great width, is liable to cripple and buckle under the vertical loads which it supports, and it is, consequently, necessary to stiffen the plate by riveting at intervals angles which are usually placed back to back, one on each side of the plate. There are two methods commonly employed of constructing this detail, and they are shown in Figure 27. The construction shown at A is the one usually employed, as it requires less labor, though more material, than the design shown at B. It is possible to do without stiffeners when the depth of the girder is small by thickening the web-plate, but this is seldom done, and angle stiffeners must be provided if the shearing-stress exceeds the value of s as given in the following formula: —

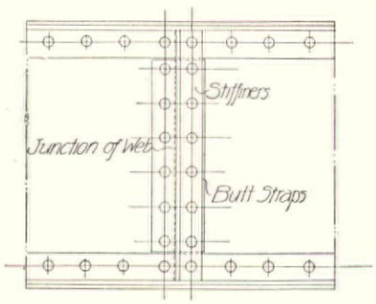


Fig. 28.

$$s = \frac{12{,}000}{1 + \frac{h^2}{3{,}000\,t^2}}$$

in which h represents the depth of the web between the flanges of the girder and t the thickness of the web-plate, both of these values being expressed in inches. Some engineers limit the use of stiffeners to plate-girders having a greater exposed depth of web-plate between the flange-angles than eighty times the thickness of the plate. In all cases, whether stiffeners are used throughout the length of the girder or not, they must be provided at the ends of the girders over the supports, and at all points on the girder where a concentrated load is located.

The stiffeners at the end of a plate-girder are always proportioned so that they will have sufficient sectional area to resist the amount of the reaction, and the usual safe allowable unit compressive strength upon such stiffeners is taken at 12,000 pounds. There is no theoretical rule by which the stiffeners can be spaced throughout the length of the girder, though it is the usual practice to place them at a distance apart equal to the depth of the girder where such a distance does not exceed 5 feet; where the girder is deeper than this the stiffeners are placed at this maximum distance. The sizes of the stiffeners are not usually determined by any calculation, and in actual practice they are made usually of $2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{5}{16}''$ angles for girders up to 4 feet in depth, and of $3'' \times 3'' \times \frac{5}{8}''$ angle for girders over 4 and less than 5 feet in depth. They could be proportioned to resist the vertical shear at the point at which they occur; this is not customary, however, and the sizes of stiffeners mentioned above are commonly employed.

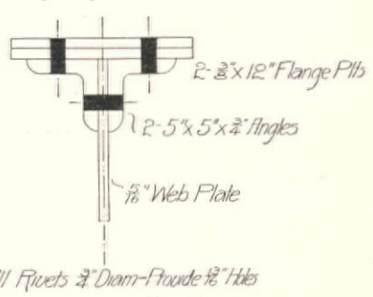


Fig. 29.

Where plate-girders are of great length and considerable depth it is impossible to obtain the web-plate in one piece, and, consequently, it is often necessary to splice this plate. Such a splice should always occur, where possible, at the point of least shear, which in a girder uniformly loaded is at the centre, and

[1] Continued from No. 1366, page 69.

it is usual in making such a splice to place the joint adjacent to a set of stiffeners. The two pieces of the web-plate abut against each other, and are reinforced on each side by butt-straps. These are usually made the same thickness as the flange-angles, and take the place of a filler underneath the stiffeners, as shown in the detail, Figure 28. Where the splice is made at the point of no shear, only sufficient rivets are required to hold the plates in position, and it is usual to pitch the rivets at the maximum allowable pitch, which is 6 inches.

In proportioning plate-girders to withstand transverse stress, it is not the practice to figure the moment-of-inertia, or section modulus of the section, for a plate-girder is regarded as a Pratt truss, the web-plate taking the place of the diagonal and vertical members common in such a truss. Considered in this way, the resisting-moment of a plate-girder is equal to the moment of the tensile or compressive strength of the upper and lower flanges, one about the other; that is, under any transverse stress the lower flange tends to tear apart with a leverage around the upper flange, as a centre-of-moment. From this the resisting-moment of a plate-girder, or M_1, equals $S\,D$, in which S equals the allowable tensile stress of the metal, and D the depth of the plate-girder. The value of S in the formula is equal to $A\,s$, or the allowable unit stress by the net area of the flange, while D is the theoretical depth of the girder taken from the centres-of-gravity of the flanges. The allowable unit stress, or s, adopted for plate-girders used in building-construction is 15,000 pounds, though, where economy demands it, 18,000 pounds may be used with safety. In figuring the area of the flange, or A, many engineers consider only the combined net section of the flange-plates and angles, while others, less conservative, consider one-sixth of the depth of the web-plate in calculating the area of the flange. In either case the area of the rivet-holes cut by a vertical plane must be deducted from the gross sectional area in order to obtain the net sectional area.

While, theoretically, the depth of the girder is the distance from centres-of-gravity of the flanges, in practice the depth of the girder is commonly taken as the width of the web-plate, or approximately the distance from back to back of flange-angles. Since M_1 equals $S\,D_1$ as previously explained, M_1 equals $s\,A\,D$ also, or by transposition, $A = \frac{M_1}{s\,D}$; that is, the net sectional area required in a plate-girder is equal to the resisting-moment at that place divided by the product of the allowable unit stress by the depth of the girder, and in applying the formula the resisting-moment required, or M_1, is obtained in foot-pounds, and the depth of the girder, or D, is designated in feet.

Example. — Determine the net sectional area for a girder having a span of 50 feet, and a depth of 4 feet, when loaded with a uniformly distributed load of 4,000 pounds per lineal foot.

Solution. — W equals $4{,}000 \times 50 = 200{,}000$, M equals $\frac{W\,L}{8}$, or $\frac{200{,}000 \times 50}{8} = 1{,}250{,}000$ foot-pounds. M equals M_1, and A equals $\frac{M_1}{s\,D}$, or $1{,}250{,}000 \div 15{,}000 \times 4 = 20.8$ square inches, which is the required flange-area. In order to provide for this area, assume the flange section shown in Figure 29, which consists of two $\frac{3}{8}'' \times 12''$ flange-plates, two $5'' \times 5'' \times \frac{3}{4}''$ angles, and one-sixth of the $\frac{5}{16}''$ web-plate.

The combined gross area of these rolled shapes is as follows: —

Two $\frac{3}{8}'' \times 12''$ flange-plates	9.	square inches.
Two $5'' \times 5'' \times \frac{3}{4}''$ angles	14.22	square inches.
One-sixth of web-plate	2.5	square inches.
Total gross area	25.72	square inches.

It will be observed from the figure that 3 rivet-holes must be deducted, and their area, provided $\frac{3}{4}$-inch rivets are used, and the hole is made $\frac{1}{16}$ inch larger than the rivet, is as follows: —

Two rivets in vertical position $= 2 \times \frac{13}{16} \times 1\frac{1}{2}$	$= 2.436$
One rivet in horizontal position $= \frac{13}{16} \times 1\frac{13}{16}$	$= 1.469$
	3.905

Deducting the area of the 3 rivet-holes from the gross sectional area of the flange gives $25.72 - 3.905 = 21.815$, or the area of the assumed section. This is slightly greater than the required flange-area, and, consequently, the section can be adopted for the girder n question.

The single web-plate girder shown in Figure 27 is not always used, for in some cases the double web, or box, girder, as designated in Figure 30, is adopted. The principal disadvantage in the use of the single-web girder is on account of its lack of lateral rigidity, and its liability to failure from sidewise deflection. The box-girder should always be used where there is a great length of span, and where wide flange-plates are necessary in order to obtain lateral stiffness; the great disadvantage

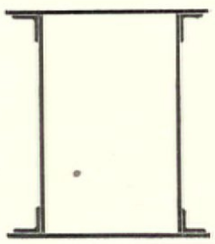


Fig. 30.

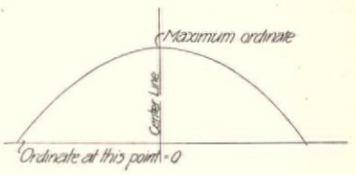


Fig. 31.

in the use of box-girders consists in the fact that they are difficult of access for inspection and painting. Where a single-web girder is not held in position laterally, the width of the flange-plate should be equal, at least, to one-twentieth of the span. If such a proportion does not exist, the sectional area of the upper flange should be increased by the following formula: —

$$A_1 = A\left(1 + \frac{l^2}{5{,}000}\right)$$

in which A_1 equals the necessary gross sectional-area in inches required in the top flange of the girder; A equals the gross area in inches required in the top flange of the girder when the vertical moment alone is considered, and l equals the quotient obtained by dividing the length of the span in inches by the width of the flange, likewise in inches.

As previously explained, when a beam is uniformly loaded, the bending-moment upon it may be represented by a parabola, and as the flange-area is directly proportional to the bending-moment, the flange-area throughout the girder may likewise be represented by a parabolic curve. By observing this curve, as shown in Figure 31, it will be noted that it has an altitude or ordinate of zero at the abutments, and rises to a flat curve at the centre of its length where the greatest ordinate occurs. This would show that practically a flange-area of zero is needed at the abutments, while at the centre of the span the maximum area is required. Where, therefore, a girder is proportioned with a number of flange-plates, it is usual to extend these flange-plates only so far on each side of the centre of the girder as may be required. The greater the number of flange-plates, the more nearly may theoretical economy in the design of the girder be obtained. It is customary to extend the flange-angles throughout the girder, and where the girder lacks lateral support, it is the best practice to carry the first flange-plate the entire length of the girder, as well as the flange-angles. The remaining flange-plates may be reduced to within 2 feet of their theoretical length, a foot being necessary on each end over and above the theoretical length in order to provide for riveting. The theoretical length for the flange-plates on any girder supported at both ends and uniformly loaded may be

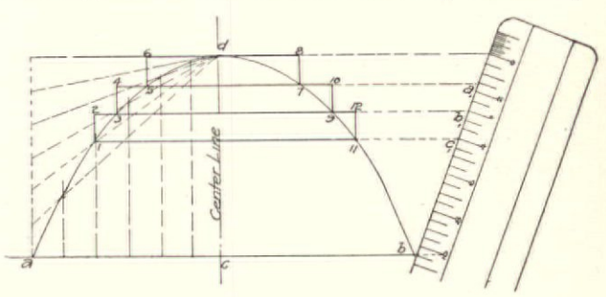


Fig. 32.

determined by means of the diagram shown in Figure 32. In this figure lay off the line $a\,b$ equal by any scale to the span of the girder, and make the length of the centre ordinate $c\,d$ equal by any scale to the maximum net flange-area, divide the ordinate at a into any number of equal parts and likewise the distance $a\,c$ into the same number of parts, extend lines from the divisions upon the vertical line at a, radiating to the point d,

and draw from the divisions upon the horizontal line $a\,c$ the ordinates as shown; through the points at which the ordinates intersect the corresponding radial lines draw the curve which is a parabola as designated. By laying any scale diagonally across the drawing, as shown, so that the number of divisions upon the scale equals the number of square inches in the combined net flange-area, the areas of the several flange plates and angles may be laid out; these areas are obtained by counting off a number of divisions as at a', b', c', equal, respectively, to the number of square inches in the net area of the several flange-plates. Extend from the points a', b' and c' the horizontal lines designated, and from the point of intersection of these horizontal lines with the parabola draw the heavy vertical lines to the next horizontal line above, as shown at 1–2, 3–4, 5–6, 7–8, 9–10, etc.; then the length of the several flange-plates may be found by scaling the distances 6–8, 4–10, 2–12, with the same scale to which the span of the girder $a\,b$ was laid off. These lengths are the theoretical lengths of the flange-plates, and a foot at each end must be added in order to determine the length of flange-plate that should be used. Where it is not desirable to use the graphical method there is a formula by which the length of the flange-plates may be calculated where the girder is uniformly loaded. This formula is

$$L_1 = L\sqrt{\frac{A_1}{A}}$$

in which L_1 equals the theoretical length in feet of the flange-plate in question; L equals the length of the girder from centre to centre of supports, in feet; A_1 equals the net sectional area of all of the flange-plates counting from the outside of the girder and including the flange-plate in question, while A equals the total net flange-area.

Example. — Assume that a plate-girder having a span of 60 feet has a net flange-area equal to 40 square inches, and that the flange is composed of two flange-angles and four $12'' \times \frac{5}{8}''$ plates, each of which has a net flange-area equal to 6.25 square inches; determine the length of the four flange-plates.

Solution. — Since a girder having such a narrow flange lacks lateral stiffness, the flange-plate next to the flange-angles should extend the full length of the girder; by substituting in the formula, the length of the outside plate is equal to L_1, or

$$60\sqrt{\frac{6.25}{40}} = 23.40 \text{ feet};$$

the length of the flange-plate next to the outside one is equal to L_1, or

$$60\sqrt{\frac{12.50}{40}} = 33.60 \text{ feet},$$

while the third flange-plate is equal to L_1, or

$$60\sqrt{\frac{18.75}{40}} = 40.80 \text{ feet}.$$

These lengths, as previously explained, are the theoretical lengths, and must be increased at least 1 foot at each end.

Where a girder is loaded with a number of concentrated loads the flange-plates can also be stopped off and a saving in

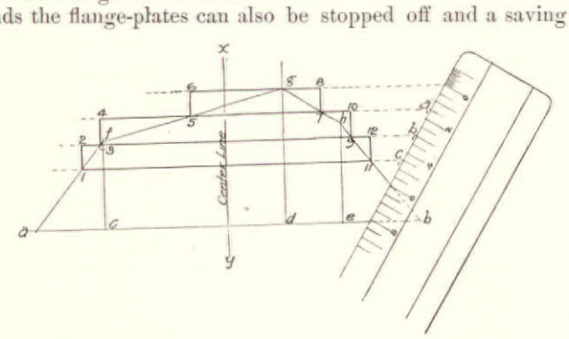


Fig. 33.

metal and riveting thus instituted. The method commonly employed is shown in Figure 33 and consists of laying off the line $a\,b$ equal by any scale to the span of the girder and locating accurately upon it the concentrated loads, which may be of any number and amount, as shown at c, d and e; upon ordinates located at these points the amount of either the bending-moment or the net flange-area required at the several locations must be laid off, as at c-f, d-g, e-h; then by connecting a-f, f-g, g-h and h-b, a true diagrammatic representation of the bending-moment is obtained; draw the indefinite horizontal line through g and lay off with the scale as shown, and as previously explained in connection with the uniformly distributed load, the net sectional area of the flange plates and angles; these divisions are made as at a_1, b_1 and d_1, and the horizontal lines extended from these

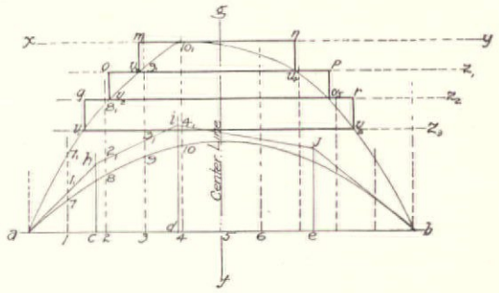


Fig. 34.

points as shown. Where these lines intersect the funicular polygon $a\,f\,g\,h\,b$, as it is called, draw the vertical lines as shown at 1–2, 3–4, 5–6, 7–8, 9–10, 11–12, and by measuring 6–8, 4–10, etc., the theoretical length of the several flange-plates is determined, the measurement being made as before, with the same scale to which $a\,b$ was laid off. These flange-plates must be located properly with reference to the centre line $x\,y$, and the location may be determined by scaling from the diagram.

The graphical method for determining the length of flange-plates where the girder supports both a uniformly distributed load and several concentrated loads is designated in Figure 34. This diagram is a combination of the methods employed for the uniformly distributed load and the concentrated load. It consists of laying off to scale the span of the girder as a, b, and upon the centre line $g\,f$ marking to scale a distance equal to the bending-moment caused, or the flange-area required, by the uniformly distributed load only; through the points a and b, a parabola is drawn as described in connection with Figure 35; from the points c, d and e, which are the locations of the three concentrated loads upon the girder, ordinates are erected, and upon these ordinates the bending-moments, or flange-area, due to the concentrated loads alone are laid off, as at c-h, d-i and $e\,j$, using the same scale as in measuring the parabola. The diagrammatic figure consists of the parabola representing the uniformly distributed load, and the funicular polygon representing the concentrated loads; both together express the distribution of the bending-moments upon the girder. The combined effect of the two loads is obtained by dividing the span $a\,b$ into any number of equal parts and from these divisions, as 1, 2, 3, 4, 5, etc., extending the vertical ordinates, lay off the distances 1–7, 2–8, 3–9, 4–10, etc., from the points 1_1, 2_1, 3_1, 4_1, respectively, obtaining the measurements 1–7_1, 2–8_1, 3–9_1, 4–10_1, etc.; from these points draw the irregular curve as designated; through the highest ordinate of this curve draw the horizontal line x-y, and by placing the scale as designated lay off the divisions representing the net sectional area of the flange-angles, as explained in connection with Figures 36 and 37, and as shown in this diagram at z_1, z_2, z_3; from these points draw the several horizontal lines designated, and where they intersect the irregular curve, as at v_1, v_2, v_3, v_4, v_5, v_6, etc., draw the short heavy vertical lines upwards as designated; then by measuring the distances m-n, o-p, q-r, etc., the theoretical length of the several flange-plates may be determined. As explained in connection with the diagram for determining the theoretical length of the flange-plates where the girder supports several concentrated loads, the flange-plates in this case must be placed with relation to the centre line as called for by the diagram.

The several principles and usual methods for proportioning and designing plate-girders have been given; the rivet-spacing, however, is important, and will be explained in the next article, in connection with the strength of rivets. M. M. Sloan.

[To be continued.]

Ruskin Memorial in Poets' Corner. — The work of the committee formed for the purpose of placing a memorial of John Ruskin in Westminster Abbey has been accomplished. The memorial takes the form of a bronze medallion. The sculptor was the late Mr. Onslow Ford, R. A. The place assigned to the memorial by the Dean and Chapter is in Poets' Corner, immediately above the bust of Sir Walter Scott. — *Exchange.*

MODERN OFFICE-BUILDINGS.[1]

SOME of Mr. Bolton's remarks indicate that he recognizes, what other keen observers have already recognized, that the high steel-skeleton office or hotel building is not simply an architectural problem, but a problem in which the architectural treatment is but one of the coördinate parts of the design.

The architectural treatment is not and should not be considered as the controlling factor — though it generally is — in the design of this modern embodiment of concentrated facilities for administrative business or communistic living.

In buildings of this character a very little thought will be required to perceive that the architectural design is not the controlling factor, and therefore should not be allowed to fix the conditions, to which all other parts of the design should conform. To illustrate this idea: The architectural design can be changed, almost an infinite number of times, without the mechanical-engineering essentials being changed at all, and with only such changes in the structural design as may be required locally by the changed architectural disposition of the materials composing the walls, etc. If the truth of this proposition is recognized, it is evident that no extended argument is required to show that the present method is wrong, in putting in the hands of the individual designer of the façade the final decision on all matters of design; and the truth of this proposition can be admitted and acted upon without in any way belittling or making light of the architectural problems, which are of great importance, and should only be entrusted to broad minds and capable hands. For as long as appearances continue to be a factor in human affairs, and as long as beauty of line and form appeal to our sense of intellectual fitness, just so long will the architectural problem be worthy of the most careful consideration.

The recognition of the fact that the architectural part of high-building construction is not the governing factor gives no excuse for slighting this part of the design, but it should be also recognized that the architectural problem, in its specific relation to high-building construction, can be worked out to a rational solution only when the limits which bound it are defined by the factors which actually should control the design as a whole. High steel-skeleton building-construction may be defined as an engineering work with an architectural accompaniment.

It is perhaps already evident that in order that each of the elements entering into the design as a whole be given proper recognition, and its due value as a factor, the chief designer should be a man capable of judiciously passing upon the claims of each of these elements to precedence. Experience has shown that the man who owes his training exclusively to the art-school and its influences cannot or will not consider the engineering side of the problem. The men who spell their art with a capital A deplore science, as a necessary evil, which disturbs their mental repose; and, if not as an evil, then as a bore, which interferes with and places practical obstacles in the way of their flights of fancy. Mathematics and science are looked upon by men of this type as matters of formulas, rule-of-thumb and mechanical routine, a matter to be learned out of a book, which can be mastered in about the same way that one learns to recite a piece of verse or prose, or as one learns a trade. Men of this type do not think that imagination enters into the study or practice of science, and particularly the science of engineering, and look upon themselves as the only rightful possessors of the wings of flight or imagination. They have no conception of the trained imagination required to comprehend the higher mathematics, nor of the sustained and logical derivatives of the product of thought, obtained from mathematical investigation. Having no appreciation of the intellectual basis of engineering, it is not to be wondered at that they treat the demands of science with scant consideration. It is, therefore, hardly to be expected that the graduate of the art-school only, whose whole mental training has been given up to the study alone of the relative values in the play of light and shadow, the balancing of solids and openings, the study of the appearances of things, or the art of seeming, can be qualified to pass upon problems which deal with realities or things as they are. In works of magnitude, under the guidance of such minds, the structural and mechanical parts of the design are often sacrificed to supposed requirements of art; and the result is an incongruous composite of the total elements of the design, and, necessarily, a failure.

Another type of mind which is unsuited for the position of designer-in-chief is that type which has no appreciation of art and beauty, and has no other "measures" than those of "economy" and "efficiency." This type, while useful in a large way as a counterweight and a standard of comparison, often misses the best solution, or possibly never attains it, in a problem of this character, by the narrow view it takes of the things with which it is not familiar, and, by reason of one-sided training, is not fitted to be an intelligent and impartial judge of the various elements entering into a composite and complex design.

The designer best qualified for this important position of designer-in-chief is evidently one who has a knowledge of the broad essentials and limitations of the various parts of the design, the judicial temperament permitting the balancing of an advantage against a disadvantage, a breadth of mind enabling a comprehensive view to be taken, coupled with courage and decision; with all these qualifications, governed by a broad and catholic love of beauty in all its manifestations — not only of beauty of form and line, which is evident and can readily be comprehended, but of the more subtle beauty of science and its results.

This combination of qualities is not an impossible one, or, in fact, necessarily a very rare one. It is realized, perhaps, more definitely in the scholarly engineer, whose acquaintanceship with facts and laws governing matter is accompanied with a broad knowledge of the fundamental requirements of art, and to him must eventually come the position of master builder.

If the composite design of one of these engineering-architectural problems is analyzed, it will be seen to admit of two main subdivisions:

(1) The engineering design.
(2) The architectural design.

The engineering design can be subdivided into its structural and mechanical components: The structural component, comprising the foundations and superstructure, including the stability of the structure against vibration, wind forces, fire and corrosion. Under the head of structural design should also come the planning of the floor areas and spaces, with all their subdivisions. Usually, the floor-plan is laid out by the architectural designer without reference to the structural design, and this results frequently in poor and expensive construction. The consideration of the floor-plans and the structural design should take place at the same time — and preferably by the same mind, or, at any rate, by minds working in harmony, for the floor-plan and the structural arrangement are truly dependent on each other. The arrangement of the floor is not strictly an architectural problem, though it is frequently considered as such; it is also a scientific one, or one in which all the factors can be determined and balanced one against the other, and an equation arrived at figuratively, from which a result can be obtained which rests upon determined facts, and not upon mere whim, prejudice or predilection. Daylight has a certain carrying and distributing power which does, or should, determine some of the dimensions of rooms.

Transportation facilities and convenience of access determine the local arrangement of the office-areas around the elevators, or, rather, the location of the elevators with reference to the "centre-of-gravity" of the office-areas. The economic location of lavatory-fixtures requires the grouping of these fixtures around common drainage and water-supply centres, which in turn demand certain broad arrangements of lavatory rooms and fixtures, usually not difficult to comply with.

The lighting and heating systems require distributive local centres and sub-centres, which should bear certain relations to the groups of offices and sources of supply.

Not infrequently, the floor-plan is decided upon and then turned over to the structural designer with instructions that nothing can be changed. This results sometimes in the use of structural expedients which are expensive and structurally unsatisfactory, and which could have been avoided by an appreciation of the relative values of each of these matters. The consideration of the scheme, also, from one standpoint only often results in the sacrifice of the best arrangement of the mechanical equipment.

When the planning of the floors and the structural design is under discussion the fireproofing and rustproofing should also be considered. It is not an uncommon thing to find the fireproof covering cut away to get in a door or window frame, or some piping that has been overlooked or not considered when the planning was under consideration, and for this there is no excuse, unless haste in preparing the plans — due to no fault of the designer — is given.

Fireproofing is generally given but scant consideration, and rust-proofing little, if any, and for this neglect no adequate excuse can be given. The fireproofing is seldom considered as a part of the design, but is taken care of by general methods of allowances over the dimensions of the beams, girders and columns. The intelligent designing of fireproofing demands a knowledge of the weakening effects of heat on steelwork. The maximum strength of iron is at about 400 degrees Fahr., and there is a loss of strength of about 1,000 pounds per square inch of section for every increase of 100 degrees in temperature. A knowledge of the rate of transmission of heat through various substances and dead-air spaces, and a knowledge of the resistances of various materials to the action of fire and water, separately and alternately — a little knowledge of these various matters — will be sufficient to show the insufficiency of many of the present methods, and the inadequacy of many of the materials used for this purpose. Porous or semi-porous terra-cotta properly made and burned is probably the best material in use, but, as it is manufactured to-day, it is too thin, and the standard beam-coverings, with a thickness of only 1 inch over the lower flanges of the beams, are absurd, and the column-coverings and the methods of fastening them on the steelwork are but little better.

The question of rust-proofing is seldom considered, and is often entirely ignored. The rusting of iron is such a familiar fact that it is surprising how little attention is paid to it. Millions of dollars are being invested yearly in buildings the durability and stability of which are entirely dependent upon the iron framework, yet, beyond giving the metal-work a coat of paint, nothing is done. The fact that Portland-cement preserves iron from corrosion is now well known, and the chemistry behind this fact should be as well-known. Rust is caused by three factors working together, viz., water, an acid, and oxygen. If these three factors are not allowed to act coördinately, rusting cannot take place. Portland-cement, because it is a product

[1] A letter by William Copeland Furber, M. Am. Soc. C. E., read before the American Society of Civil Engineers, and published in the *Proceedings* of the Society.

of lime, furnishes a base which neutralizes any acid likely to be present under ordinary conditions, and therefore any water which may filter through it can do no harm. This fact is acted upon in the use of steel in the foundations of buildings below the water-line, but little use is made of the knowledge above the cellar-floor.

The mechanical component of the engineering design, comprising the steam-power plant for operating the elevators, the lighting, heating and ventilation systems, and the layout of each of these parts; the lighting-system, consisting of dynamos, distributive wiring and storage-battery; the heating-system, consisting of the distributive piping, etc., with the fans and ducts required to supply the heat and air under pressure, and to remove the foul air; the operating mechanism of the elevators; the water-supply for individual and general uses and fire-protection; the drainage-system, and the telephone and telegraph wire-systems; should all be considered and tentatively laid out before the final plans are decided upon.

The requirements of each of these subdivisions of the mechanical design require most careful study, and, as they are a vital part of the design as a whole, they should be laid out to accomplish the best possible results, and this arrangement adhered to as closely as is permissible with reference to other parts of the scheme. Most of the evils of crowded and unsatisfactory layouts of the mechanical equipments in high buildings are the result of lack of knowledge, on the part of the designer-in-chief, of the conditions of arrangement conducive to the best results. The fact that the equipment can be placed and operated in inconvenient and contracted spaces is also taken advantage of, and the mechanical equipment relegated to such spaces as can be devoted to no other purposes. When the amount of money required to maintain and operate this equipment, and its proportion to the total operating expenses of the building, are considered, no defence can be made of the inadequate facilities usually allowed for its installation.

In the distributive systems of the mechanical plant, the placing of pipes, conduits, etc., in the floors, walls and partitions is frequently not considered in the detail drawings, and is generally merely specified. This neglect sometimes leads to a great deal of trouble and often to the adoption of make-shift methods, which could have been avoided by due consideration being given to the details on the drawings.

The architectural design consists in the main of the treatment of the façade, usually according to, or with the details of, some historic style; the arrangement of the windows, and, in a secondary way, the architectural treatment of the offices. This internal treatment of offices can be said to be independent of the general architectural, structural and mechanical design, and therefore not a factor in the design of the whole, with which only this particular discussion deals.

The arcitectural part of the design can be changed according to the whim or predilection of the designer without materially affecting the other parts of the design. It is therefore evident that with this liberty goes great responsibility. If the design decided upon is one of a possible thousand, and the design is a poor one, the responsibility is proportional to the number of better ways of solving the problem.

A great mistake that many architectural designers make in treating the high skeleton building is in attempting to treat it as a masonry structure. This lack of perception of the limitations of masonry construction leads them to many curious anomalies and absurd results, as, for instance, the placing of a Greek temple on top of a many-storied building, and the employment of brackets, consoles, modillions and other architectura ldetails which once had some function, but which are now, in these buildings, wired or strapped upon an iron framework.

The high skeleton building is worthy of an architectural style consistent with its serious purposes and the dignity of its place in the modern business world, and this style should express the truth of its construction and its purposes, and should not make it masquerade in borrowed clothing, pretending to be a masonry structure, yet violating some of the fundamental principles of masonry construction. Architecture needs the stimulus of new truth and new conditions, and the skeleton building furnishes them.

A CONCRETE COURT-HOUSE.

THE Nassau County Court-house, which has just been completed, is one of the most important buildings ever constructed entirely of cement-concrete. The entire work was constructed under the Ransome system, which consists of reinforcing the concrete with cold-twisted steel bars of great strength, which are placed at proper points, both vertically and horizontally, in the concrete. The general dimensions of the building are 195′ x 95′, in the form of an inverted T. It is two stories in height, 36 feet from the ground to the roof, and the height to the apex of the dome is 65 feet. The general measurements of the court-room are 38′ x 50′ and 18 feet high to the ceiling. It is situated on the second floor, with two jury-rooms and a judge's room in the rear. The foundation-walls, floors, pillars, partitions and dome are of cement-concrete. The building is practically an immense rock, cut and dressed with architectural ornament on the outside and mined inside in the form of rooms. A building of this character represents a class of construction that is certainly ahead of anything known to the building world as regards its fireproof qualities. The records of the great fires of Chicago and Boston have given proof of an unquestionable nature that cement-concrete is as good as any fireproof building-material. The exterior of the new county-court is especially attractive. The concrete is finished in a very satisfactory manner; both smooth and rough surfaces are produced with perfect success. To give the concrete the appearance of rough-dressed stone, it is gone over with pneumatic tools, except on ornamental and fine-dressed work, where hand-chisel is used. The appearance is so perfect that the difference between natural stone and the concrete is hardly distinguishable. The lines representing the joints between stones are made by placing strips of moulding lightly nailed to the inner surface of the mould. They may be arranged in such manner as desired, and of any shape or size to suit requirements. The concrete is then filled into the moulds in the usual manner, and when it is sufficiently set the moulds are removed. This leaves the concrete marked off as if built up with stone. The ornamental work was made from plaster moulds, and each part has imbedded in it the bars of twisted steel, which not only serve to strengthen it, but also afford a means of securing the ornament to the wall in a most satisfactory way. The sharpness of the detail in ornamentation of the most elaborate design is a feature of the work on this building. The court-house is connected by a concrete tunnel with the jail, which was also built according to the Ransome system. — *Stone Trades Journal.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

CORRECTION: THE A. D. CLUB BUILDING.

WE regret sincerely that we were innocently the instrument of doing injustice to the author of this design. We have been advised since publication of our last issue that in the carrying out of his design Mr. Charles K. Cummings, of Boston, associated with himself for this work Mr. J. Harleston Parker, the now senior member of the firm, to whom the entire credit was mistakenly attributed. — EDS.

DESIGN FOR A PROPOSED CHURCH IN THE SUBURBS OF BOSTON, MASS. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.: TWO PLATES.

NORTHWEST VIEW OF THE HOUSE OF MRS. L. L. SWANN, STOCKBRIDGE, MASS. MR. ROBERT S. STEPHENSON, ARCHITECT, NEW YORK, N. Y.

[**The following named illustration may be found by reference to our advertising pages.**]

THE BASSIN DU DRAGON, VERSAILLES, FRANCE; — HARDE DE CERFS, GARDEN OF THE LUXEMBOURG, PARIS, FRANCE. M. LE DUC, SCULPTOR.

[**Additional illustrations in the International Edition.**]

HOUSE OF MRS. L. L. SWANN, STOCKBRIDGE, MASS. MR. ROBERT S. STEPHENSON, ARCHITECT, NEW YORK, N. Y.

THE PHILLIPS CONGREGATIONAL CHURCH, EXETER, N. H. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

EAST FRONT OF THE SAME CHURCH.

A DOORWAY OF THE GRAND PALAIS, PARIS, FRANCE. M. DEGLANE, ARCHITECT; — THE TUILERIES: ENTRANCE TO THE MINISTRY OF THE COLONIES.

VESTIBULE: CHÂTEAU DE CHANTILLY, FRANCE; — THE GRAND STAIRWAY: THE SORBONNE, PARIS, FRANCE. H. P. NÉNOT, ARCHITECT.

THE MAURITSHUIS, THE HAGUE, HOLLAND.

THE CHURCH OF S. GIUSTINA, PADUA, ITALY. [1532–49.] ANDREA RICCIO, ARCHITECT.

NOTES AND CLIPPINGS

THE GLASTONBURY THORN. — It is to be hoped that another Glastonbury thorn will be obtained to replace the missed one in South Kensington Gardens, for in the bustle of modern times it is pleasant to be occasionally reminded of the legends and beliefs of our forefathers.

By them it was held that Joseph of Arimathæa struck his travelling-staff at Wearyall Hill, near Glastonbury, where it immediately took root, and annually blossomed at Christmas. In the reign of Queen Elizabeth it had two trunks, but one was destroyed by a Puritan, the other being preserved for a time by a flying chip, which blinded the assailant. The remaining trunk was cut down by another Puritan in the reign of Charles I. Early in the nineteenth century a small flat stone, bearing the inscription of J. A., A. D. 31, was placed to mark the site where the tree grew. Of course, the initials stand for Joseph of Arimathæa, while the date is that traditionally ascribed to his visit. So great was the demand for relics from the Glastonbury thorn that before its destruction many trees had been grafted in the neighborhood. Not only was it noted for its miraculous blossoming; its sprigs and blossoms — about the size of a sixpence — were considered sovereign specifics for avoiding the evil eye, rooting out weeds from corn, and various other evils. Its fame spread beyond the seas, and down to the reign of Henry VIII the Bristol merchants exported these blossoms to different parts of the world. Crowds, too, annually visited Glastonbury down to recent times at Christmas to see the blossoming. A curious story is told in *The Gentleman's Magazine* for January, 1753. Confusion still existed concerning the old and new style, and a vast concourse of people assembled at Glastonbury to see the trees blossom on December 25. No blossoms came on that date, but on old Christmas Day they appeared as usual. — *London Chronicle.*

False Antiques in Europe. — Philip G. Hubert, Jr., narrating in the March *Century* "A Bavarian Bric-à-Brac Hunt," has this prefatory warning concerning the tricks of the dealers: "In the way of carved furniture, I am afraid that there are more fraudulent antiques than genuine in the Paris shops to-day. There is one dealer in particular who, when closely questioned as to the origin of certain Louis XV sideboards and tables he has for sale, will tell you they came from the Château of Chenonceaux, the famous little palace where the fair Diane de Poitiers once lived and loved; and in proof of it he will show you a bill of sale, duly stamped and authenticated, of a certain lot of furniture sold to him in 1863 from the château. Hundreds of persons, doubtless many Americans among them, have bought those Chenonceaux tables and buffets, and have seen that precious document, which, no doubt, is good so far as it goes. Unfortunately, according to a rival dealer, that bill of sale covered only two sideboards and three tables from Chenonceaux, notwithstanding which, Chenonceaux tables and chairs have been pouring forth from the little shop in a steady stream for the last twenty years — enough to freight an ocean steamship. The widow's cruse of oil was nothing to it. I do not doubt that if I were to order fifty Chenonceaux tables to-morrow, the proprietor of the shop would agree, with a twinkle of intelligence, to fill the order within a reasonable time. Some time ago the neighbors of a certain petty furniture-dealer in London complained of the constant pistol-shooting in the tradesman's back yard. Haled before a magistrate, the man testified that he was a reputable manufacturer of "antique" oak chests, and that it was necessary to fire bird-shot at his new chests in order to give them a worm-eaten appearance; which anecdote recalls to me that I once saw in the window of a bric-à brac shop in Strasburg this announcement: 'The Newest Things in Antiquities.'"

Empirical Way of prejudging the Effect of a Monument. — Some time ago the well-known French sculptor Bartholdi described in *La Nature* a simple method of ascertaining what dimensions of a proposed monument will produce the desired effect on a given site. A silhouette of the design is cut from cardboard, either a scale-drawing or preferably a photograph from a scale model furnishing a basis therefor. If this can be tinted so as to give the tone of the material to be used, so much the better. The silhouette is attached to one end of a piece of soft wire, which is wrapped loosely round a cane, umbrella, or other similar support, so that its position may be shifted back or forward at will. On the site of the monument, just alongside where the base will probably come, is placed a vertical measuring rod marked off into prominent divisions. The experimenter takes his position at a sufficient distance to secure a good general view, and brings up to the level of his eye the support carrying the silhouette, aiming as with a gun towards the site. By shifting the position of the silhouette along the support it may be determined after a while where it produces the best effect, considered as furnishing the illusion of the original structure. By there noting the correspondence in height between any given division of the small design — as, for instance, the top and bottom lines of the die — and the feet or yards on the measuring rod, a scale can be established. This scale applied to the drawing or model will show what the sizes of the executed work should be. — *Stone Trades Journal.*

Destruction of Rood-lofts. — The order of Edward for the taking down of roods applied, in the first instance, simply to the removal of the rood figures, *per se*, being afterwards erroneously concluded to extend to the rood-loft, or gallery of access to them. This gallery was formed on the upper beam of the screen, into which the joists of it, with the supporting timbers of the rood figures, were framed, and its either side was defended or fenced in by a parapet along its length, to secure safe passage across. It was this gallery, or passage, to, and as such connected and associated with, the objected-to rood figures that it was the object of the reformers of Elizabeth's time to do away with, as is very clearly and explicitly shown by her order. The indiscriminating ignorance and prejudice of the age, however, failed to distinguish between transposition, "transposed" being the word of the order, and destruction, as it had already done between reformation and abolition, and from the lack of a clear understanding or a wilful misconception of former orders, had both the rood-gallery and its figures pulled down, and were continuing to pull down, the entire upper portion of the screen, extending the demolition in some instances to the entire structure of it, leaving them as that at Southwold, and in a number of other cases, is now seen stripped to their naked framing and entirely denuded of their upper part. To this condition it was not the authorized intention to reduce them. Elizabeth's order clearly defines the extent to which they were to be altered and the mode in which they were to be finished and left after such alteration. The words are as follows: — "It is thus decreed and ordained that the rood-lofts" — roods had already been previously for the most part removed — "as yet, being at this day aforesaid, untransposed, shall be so altered that the upper part of the same with the soller" — an old term for an upper story — "be quite taken down unto the upper parts of the vautes" — vaulting — "and beam running in length over the said vautes, by putting some convenient crest upon the said beam towards the church"; that is to say, the rood-loft or gallery was to be taken down to the beam or cornice above the groined canopy or vault, and was there to be finished with a crest ornament or brattishing, the common mode of finishing such a cornice or termination. — *The Architect.*

An Old-time Organ. — In Clyde, N. Y., a Wayne County village, is the oldest church pipe-organ in the United States. Additional interest attaches to the instrument from the reason that it was the first whose pipes gave music for the worshippers in old Trinity, New York City. The organ is now occupying a place of repose and honor due to the dignity of old age in the chapel of St. John's Episcopal Church. It has had a somewhat remarkable career from the time it came to the New World as a royal gift to the day its place was taken in the country church by a rival of more modern make. The organ was installed in old Trinity as a mark of Queen Anne's special favor to the Englishmen who had made New Amsterdam into New York. The gift was received with the royal command that it should never be sold, but that when the parish could afford a better one it should be transferred to a church which had no organ. After many years the old instrument was set up in Trinity Church, Utica, where it was used for more than two decades. Still honoring the precept of Queen Anne, although times had changed and royal commands had little effect among the people of the new States, the organ was sent here in 1846, and from that date to 1884 it served St. John's Church. Once it had a narrow escape, for the church was burned, but the parishioners bent all their efforts toward saving the organ, and succeeded. When the new instrument was put in position in 1884, the old Queen Anne's gift was removed to the chapel, where for more than ten years its keys have not been touched, but the parishioners prize it highly. The ancient instrument is 8 feet in height, 7 feet in width and 4 feet in depth, with one set of keys and six stops. — *N. Y. Tribune.*

Electroplating Wooden Doors. — A process of covering wooden doors with sheet-metal by means of electrolysis is at present being experimented with at Bridgeport, Conn. The excellent fire-resisting qualities of a wooden door covered with tinplate have long been recognized, since the metal covering prevents the wood taking fire, while the use of wood for the framing avoids any risk of the warping of the door by heat, allowing flames to pass through, as has happened with doors built wholly of iron. A tinplate-covered door has, however, a poor appearance, and is therefore suitable only for workshops and warehouses. By depositing copper or bronze electrolytically, it is hoped to provide doors suitable for buildings of all kinds. The method followed is to place the carefully-finished wooden doors in a hot solution of fossil gum in linseed-oil. This completely closes the pores of the wood with an impervious varnish, so that on transferring the door to the electrolytic bath the solutions are not absorbed. On removal from the varnishing bath, the edges of the door are bound with sheet-copper fixed by cement, and the rest of the door is then covered with a conducting layer of bronze powder, after which the whole is placed in an electrolytic bath, and copper deposited over the whole surface. — *Building News.*

The Illinois Central planting Catalpa Trees. — John P. Brown of Connersville, Ind., Secretary of the International Society of Arboriculture, passed through this city recently on his way to New Orleans. Mr. Brown has been employed by the Illinois Central Railroad to inspect the lands owned by that system in Mississippi with a view to selecting an area suited to the cultivation of catalpa trees. The purpose of this experiment is to raise catalpa trees on some of the unimproved lands of the Company to be utilized in the shape of cross-ties, posts and lumber. The Company has authorized Brown to plant not less than 200,000 catalpa trees, and figures that, in the course of about fifteen years, it will have a most valuable forest, furnishing thousands of dollars' worth of cross-ties, lumber, and posts of various kinds. The experiment has been tried by a number of railroad-companies in the United States. The strongest claim for the catalpa tree is the greater durability of this wood, which is said to outlast anything else in the field. — *Boston Transcript.*

Street Nomenclature in East Boston. — "Monmouth" is a familiar word to the student of Revolutionary history, and this fact was called to Lieutenant-Governor Bates's attention by the writer. "You are evidently not acquainted with East Boston," he rejoined, and then said the early founders of the island city divided the town up into sections; the first section of streets is named after the notable battles of the Revolution; the second section, running at right angles, is named after the generals in the Revolution; the third section is named after the great English poets, with the addition of Homer; the fourth section is named after the great cities of Europe, while the fifth section is named after birds. — *Boston Herald.*

Cataloguing the Papal Art-treasures. — The Pope recently received a petition to encourage the project of making a catalogue of all art-treasures preserved in Italian churches and monasteries, to prevent their being secretly purchased and exported. — *Exchange.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, MARCH 22, 1902 No. 1369

CONTENTS.

SUMMARY: —
General Sooysmith on the Life of Steel-framed Buildings. — The late Boston Strike. — Owners of High Buildings protecting their Rights of Air and Light. — Retirement of General Loring, Director of the Boston Museum of Fine-Arts. — The Applicability of Automatic Sprinklers to Hotels and Houses. — The Horgan & Slattery Contracts. 89
DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES. — VI. 91
THE BOSTON STRIKE. 94
BOOKS AND PAPERS. 94
ILLUSTRATIONS: —
The United States Post-office, Creston, Ia. — Details of Portico of the same Building. — Hatfield House, England. — The Tower of London.
House in the Rue Octave Feuillet, Paris, France.
Additional: Smithell's old Hall and Chapel, Lancashire, Eng. — House of Herr Glade, Wilmersdorf, near Berlin, Prussia. — The City Museum, Altona, Prussia. — Central Pavilion of the same Building. — House of Thomas Nelson Page, Esq., Washington, D. C. — House of Paul L. Ford, Esq., No. 37 East 77th St., New York, N. Y. — Entrance to same House. . 95
NOTES AND CLIPPINGS. 95

THE newspapers have commented very generally, although not, in some cases, very intelligently, on General Sooysmith's address, delivered a few days ago before the Chicago Real Estate Association, in which he warned his hearers that many of the great steel-framed buildings, for which Chicago has long been famous, had only a few years of existence before them. Architects generally have long known General Sooysmith's opinions in regard to steel-framed buildings, and accumulating experience has confirmed their correctness; but the warnings, given fifteen years ago, that an improperly constructed steel-frame building would not last more than twenty years, seem much more serious on repetition now, when, if they are well founded, many millions of dollars' worth of property, and, perhaps, many lives, hang by a thread, which may break at any moment, and is sure to break within a very few years. General Sooysmith drew, as he has always done, a sharp distinction between a steel-frame building properly constructed, in which every piece of metal in the main supports is thoroughly embedded in cement, in contact with it, and those in which the metal is surrounded with stone, or brickwork, built up against it, but in such a way as to leave crevices, through which air can circulate. Buildings of the first sort, he said, were good for two thousand years, while, in those of the other kind, unfortunately much more numerous, the metal corrodes with great rapidity under the influence of the moist air in the crevices, and corrosion of one-fifth the substance of the metal of a supporting member at any given point would, in general, cause its failure.

WE do not know what authority General Sooysmith finds for his opinion that iron, even thoroughly embedded in cement, will last for two thousand years in this climate; and, as we have often said, actual investigation on these points is urgently needed; but the fact that neglected iron, exposed to damp air, rusts very rapidly, is well known. In the case of iron bridges, and other structures, the metal of which is visible, and can be cleaned and repainted as soon as it shows signs of rust, engineers usually reckon on an average life of only forty years, yet the air around these is almost always dry, and it is only in clear nights, when the dew gathers on them, and during rains or fogs, that they rust; while the steelwork in a building is not only covered up, out of reach of the scraping and repainting on which the preservation of a railroad bridge depends, but it is sheltered from the drying influence of the wind, at the same time that the air around it is kept saturated with moisture by evaporation from the enclosing masonry, which is always damp, even the dryest winds only removing superficially the water which all brick and stonework absorbs from rain. Moreover, in railway bridges, it is now usual to arrange the structure so as to avoid sudden collapse, by distributing strains, so that one or two overworked members may even given way, without involving the destruction of the whole, as in the recent case of the Brooklyn Bridge; but in buildings this is difficult, as the necessity for large windows in the lower stories makes it imperative to concentrate the supports there, and the failure of a single first-story column would generally involve the destruction of any of our large steel-frame buildings. Unfortunately, the first-story supports are more unfavorably placed, in regard to danger from corrosion, than any other part of the structure, for the water that is absorbed by the upper portion of the walls in storms slowly sinks by gravitation to the bottom, keeping the lower part damp, even when the upper part is dry. Some years ago, Mr. Post, we think, uncovered a wrought-iron first-story column, in making some alteration, and found it so corroded that he called the attention of other architects to it. The insurance companies also observed the circumstances, and, in consequence, as was reported, of their rather hasty deductions from them, first-story uprights, and even the wall columns of upper stories, were, for some time afterwards, very commonly made of cast-iron, on the ground that cast-iron verticals were less likely to suffer from corrosion. Architects, who often see cast-iron columns very badly corroded at the base from dampness, do not place much faith in the common superstition, and the difficulty, if not the danger, of connecting cast columns with the other members of a steel frame, led to the abandonment of this mixed construction, which is now rarely used. The question is now, therefore, practically reduced to that of the endurance of steel columns surrounded by masonry, not in the best manner, but in the manner commonly employed. Nothing can determine this question but actual investigation, and the sooner such an investigation is made the better. A twenty-story building which is likely, in the opinion of the best authorities, to fall at any moment will hardly be found a profitable investment, and the collapse of a single steel-framed office-building from corrosion would assuredly take many millions of dollars from the pockets of the owners of other buildings of the kind all over the country. In order to prevent the panic among the owners and tenants of such buildings which would certainly follow the failure of the first one, the only effectual resource is to make examinations at once, before the first failure occurs, beginning with the oldest buildings. It would be a comparatively easy matter to uncover, one at a time, the first-story columns of such a building, and replace them, if necessary, with others, better designed. This could be done, now, without exciting the apprehension of tenants, while a year or two hence it would be much more alarming, and, after one building had fallen, it would be the signal for the precipitate abandonment of every building in which it was attempted, however slight might be the real cause for uneasiness. So far as the profession is concerned, while it is the cheap structures, built on speculation, rather than those designed and supervised by architects, which have most to fear, even the latter wish to know, more definitely than is now possible, what are the conditions on which the durability of the modern mixed construction of iron and masonry depends, so that they can provide more intelligently for their future buildings, and, if necessary, direct precautionary operations in connection with existing ones. It is safe to say that no architect would willingly give up the advantages which the mixed construction offers, and it is very much for the interest of the community to use every possible means of learning how to make it secure and permanent.

THE great transportation strike in Boston came to a sudden and inglorious end, mainly through the intervention of one sensible man — Governor Crane. Instead of appealing to philanthropists or politicians, as much interested as themselves in posing before the public, the managers of the strike made the mistake of carrying their woes to a man who acts, instead of talking. When the various parties, after much newspaper interviewing and telegraphing to distinguished persons, had assembled before the Governor, the latter, instead of making an oration on the dignity of labor, and his anxiety to promote the interests of the workingmen, without neglecting those of capitalists, asked what the strike was about. This somewhat obvious question threw the strike managers into great perplexity. Nobody dared to say that it was an attempt to shut out from transportation goods not made by members of unions, or to drive out of business people who carried such goods. Fortunately, one of the champions of labor bethought himself of an old decision of the Massachusetts Supreme Court, which held that an employé of a railroad, who got on the wagon of

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

an express or transportation company, did so at his own risk; and, mentioning this decision, complained that one of the Massachusetts railway companies required its freight handlers to get on express wagons when necessary, to help the teamsters unload. The Governor listened patiently, and replied that if the unions would immediately declare the strike off, so that all the men could go back to work the next morning, he would see what he could do with the railroad company mentioned. The assemblage then retired, and the strike was forthwith called off, nearly all the men presenting themselves for employment the next morning. Meanwhile, the Governor, faithful to his promise, requested the New Haven Railroad officials to change their rule about obliging their men to get on wagons; and, although the request was declined, the main purpose, of puncturing a huge bubble of misunderstanding and pretence, and setting several thousand men at work again to support their families, at the same time that a small tangible grievance, affecting a few men, was discovered and put in the way of correction, was happily accomplished.

THE New York *Evening Post* mentions a case in which a four-story building on Broadway is being torn down, to be replaced by a two-story structure. The explanation of this is that on each side of the lot in question is a lofty office-building, with windows overlooking it. If the four-story structure should be replaced by one of twenty stories, a large number of windows in the adjoining offices would be blocked up, and the owners of the latter, in order to protect themselves, have been obliged to buy the estate; and, in order to obtain some income from it, without interfering with their own offices, have arranged for the new two-story building, which is already leased for forty years to a bank, which will occupy the whole of it. The owners of many of the New York "sky-scrapers" have been obliged, in the same way, to buy neighboring estates, often at very high prices, and will, undoubtedly, improve them in some similar fashion, so that, as the *Evening Post* says, the business part of New York bids fair to become a compound of very high buildings alternating with very low ones. In some ways, a two-story building is very attractive to a bank or trust company, and, in Boston, a firm of private bankers has already built such a structure for its own use; but the rent of a two-story building, on land costing from one to two hundred dollars per square foot, must either be large, or the owners must content themselves with a small income from their investment.

THE friends of the fine-arts in Boston will greatly regret the retirement of General Charles G. Loring from his post as Director of the Museum of Fine-Arts. Although not always under the same title, General Loring has been, practically, the chief administrative officer of the Museum of Fine-Arts since its organization, in 1870, and has seen the institution grow from a small affair to one of great importance, possessing, in certain departments, some of the finest collections in existence. In all its transactions, General Loring has been the judicious and discerning executive officer, and the favor with which the Museum is universally regarded is, no doubt, due, in great part, to his personal character. His health is, however, feeble, and a man of seventy-three, who has given thirty-two years of unwearied labor to the interests of such an institution deserves the rest which he asks for, and in which he may, it is to be hoped, continue for many years to enjoy the reward of his efforts in the knowledge of the benefits which they have conferred upon his fellow-citizens.

WE have received a letter from a correspondent in Philadelphia, warmly advocating the use of sprinklers in hotels, as a protection against fire, and mentioning that, according to the writer's information, only two architects in Philadelphia know what sprinklers are. We are quite sure that there must be some mistake about the latter point, for Philadelphia is a manufacturing city, and in all the other manufacturing towns that we know of, the architects are generally well informed in regard to the uses of automatic sprinklers, as well as in regard to the inconveniences which sometimes attend their installation. Among these, not the least is a tendency, with some sprinklers, to leak and drip, while, with others, a current of very innocent hot air, from a gas-burner or fireplace, has been known to melt the fusible alloy by which the valve is kept closed, and allow a deluge of water to escape; so that even such good things as sprinklers need to be used with discretion. Of course, there are several varieties of dry sprinklers, which, even if they open, do not scatter any water until a main valve is turned; but architects are not kept so well informed by the manufacturers in regard to improvements of this sort as would be desirable, and they must be guided by the best knowledge that they possess in deciding whether to require them in their buildings, and how and where to install them.

IT is hardly necessary to say that a hotel proprietor, for example, would view with extreme disapprobation an installation of sprinklers over the costly furniture in his public rooms, and there are not many private houses, even, where a network of iron pipes, dotted with sprinkler-heads, would be tolerated under the drawing-room ceiling. At the same time, there are many places, both in hotels and private houses, where a few sprinklers would not be objectionable, and might be of great value; as, for instance, in the basement rooms, where most of the fires in such buildings originate, and, possibly, over elevator-shafts, although it is doubtful whether a shower of water would do much to check flames entering the shaft from below, and drawn up over the oily ropes. If we are not mistaken, insurance-companies make no allowance in premium rates for sprinklers unless the building is thoroughly equipped with them; so that owners of hotels and dwelling-houses do not have this inducement to use them; but the feeling of safety which they give is worth a good deal, both to proprietors of hotels and fathers of families, and, if suitable efforts were made by the manufacturers of them to bring them to the attention of architects and house-owners, it is quite probable that the use of such an efficient and inexpensive means of protection from fire might be greatly extended.

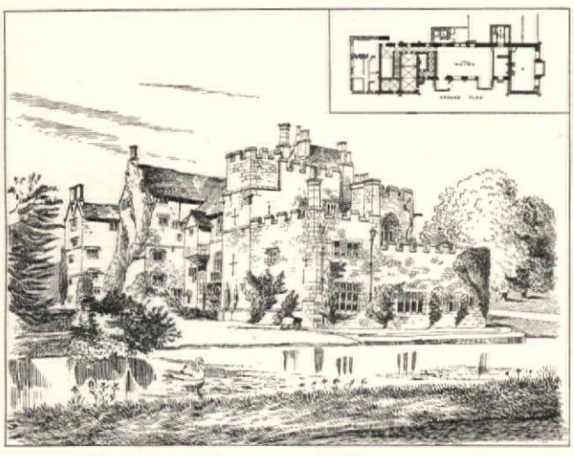
WE never like to see anybody persecuted, and it is, therefore, with a critical eye that we have followed the proceedings intended to remove Messrs. Horgan & Slattery from any portion of their employment as architects of municipal buildings in New York. Whether they are great artists or not has nothing to do with the question. If, such as they are, they were legally employed, by officials authorized to engage them, to do professional work for the city, we should not countenance any movement to take advantage of a change in the political control of the city to transfer their work to some one else, however superior the other person might be in artistic capacity. Of course, we are glad to see municipal work entrusted to the best artists that can be found, but the way to get municipal work done by great artists is to elect officials who will employ them, and not to do a wrong to innocent people who have been employed by the authorities duly chosen. It is fair to the profession in New York, and to the Corporation Counsel, Mr. Rives, to say that this has been the attitude of both, and that the newspaper clamor for the dismissal of Messrs. Horgan & Slattery has not been supported by any of the better class of architects.

THE Corporation Counsel has declared from the first that contracts legally entered into between Messrs. Horgan & Slattery and the municipal officials should be maintained. Two important ones have, however, been found plainly illegal and void. One of these, which provided for repairs on the County Court House, to the value of about two million dollars, and, in various ways, promised the architects a commission of about ten per cent on that amount, was found never to have been certified as the law requires, and, even without that, to have been plainly illegal, from the fact that no appropriation had been made for such repairs, a circumstance which, under the law, makes void any contracts entered into in connection with them. Another municipal commission has been taken away from the same architects on a different ground. They were formally instructed to prepare designs for a certain building, to cost not more than four hundred and fifty thousand dollars. The designs were made, and estimates invited, and the lowest bid was six hundred and sixty-six thousand dollars. This seemed to the Corporation Counsel sufficient reason for cancelling the commission, and there is no doubt that he was legally justified in doing so. It has been held that if the lowest bid received for a building is not more than ten per cent higher than the limit to which the architect was instructed to conform, the architect cannot be discharged for that reason, but must be allowed an opportunity to revise his plans and specifications, so as to bring the cost within the sum specified; but an excess of nearly fifty per cent would, undoubtedly, be regarded by any court as a failure, on the part of the architect, to comply with the terms of his engagement, so gross as to release the other party.

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES.[1]—VI.

PERPENDICULAR PERIOD.

THIS period of architecture, commonly called the "Third Pointed," or "Perpendicular," extended through the reigns of Henry V, Henry VI, Edward IV, Edward V and Richard III — from 1391 to 1485. This is sometimes bracketed with the Tudor period, but,



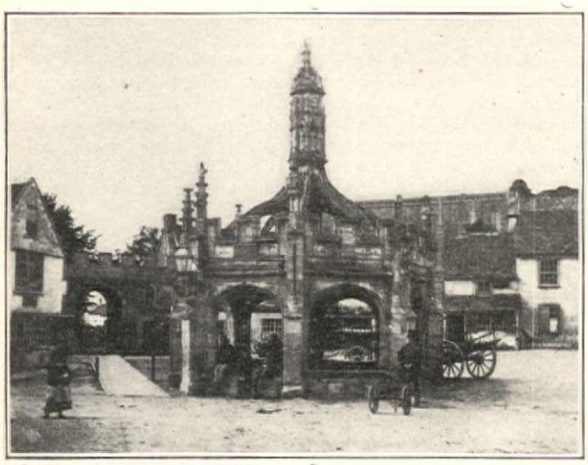
Broughton Castle, Oxfordshire.

as the latter is so well defined, and its salient features so very characteristic, it is proposed to treat it separately.

The early portion of this century was marked by constant warfare with the Welsh on the western borders, or with the Scotch on the north, with whom the disaffected barons sided more or less. There was also intermittent war with France, — sometimes truce, but never peace. It was during these wars that the ill-fated Joan of Arc formed one of the prominent features in the history of the times. During the latter portion of the period the civil "Wars of the Roses," between the houses of York and Lancaster, devastated the north of England.

Their effects on the architecture of the period were indirect, but are very apparent to the student. It was the way of the time that "to the victors belonged the spoils"; thus, a castle seized by the Royal forces from a baron aiding the King's enemies was forfeited and, by process of attainder, the owner was outlawed and all his property and estates were forfeited to the Crown. Success in war, therefore, placed great estates, money and titles at the disposal of the Crown, and these were distributed as rewards to the King's most efficient supporters. Thus, many of the castles of turbulent barons were dismantled and partially destroyed; many estates changed hands by gift or by sale, and the new proprietors rebuilt or enlarged them in the style of the period. This stimulated building and induced a certain emulation among the owners, thus incidentally advancing the progress of architecture.

The great Earl of Warwick, called the "King-maker" whose doings are so graphically chronicled by Bulwer Lytton in "*The Last of*



The Market-Cross, Malmesbury, Eng.

the Barons," was of this period. In his various mansions 30,000 people are said to have fared daily, giving some idea of the extent of the retinue of a great lord of the time, the amount of domestic accommodation he needed and his consequence in the State.

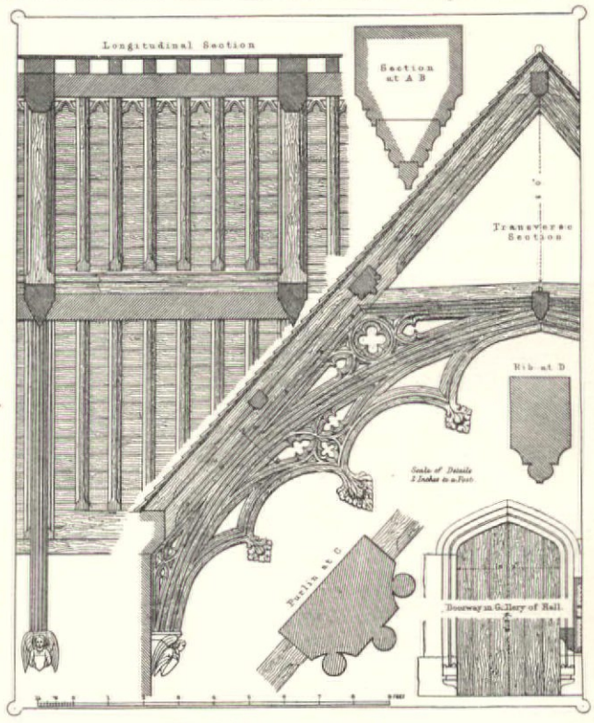
It was an age of sudden rebellious risings, sudden victories and defeats, followed by swift retribution, the attainder and beheading of the insurgent leaders, and of frequent retaliatory murders.

[1] Continued from No. 1364, page 53.

Troublous as was the fifteenth century, it was an age of increasing interest in literature and art. Princes and nobles began to take pride in the collection of books and in the encouragement of authors, transcribers and illuminators. Many of the missals, breviaries and books of these days remain as some of the choicest productions of any age, and may be seen in the British Museum and other libraries. But, as long as books could only be multiplied in manuscript, they were necessarily both scarce and costly. The monks were the first transcribers as well as authors, but, later, copying became an established vocation.

Paper at this time began to take the place of the parchment hitherto in use, and William Caxton, who had learned the art of printing from movable type in Belgium, came over and set up a printing-press in Westminster and commenced by cutting his own type in imitation of the writing of the period. The ballads of Chevy Chase and Robin Hood are of these times and are of great historic interest.

This century is also remarkable for the introduction of the mariner's compass, the discovery of India and America, and the great commercial expansion that followed. It was a time of transition in all the affairs of life and the habits and customs of the nation. Social conditions were steadily improving, and this was particularly noticeable in the dwellings of the more peaceful classes. The increase in wealth, due to commercial activity, led to a demand for greater comfort, greater accommodation, and improvement in the conveniences of living. The traders and artisans were rapidly becoming of greater usefulness to the community and of more consequence to the State. The serfs had become independent laborers, and the retainers, those that remained, discharged the domestic



The Roof: Canynges House, Bristol.

duties of the establishments. The men-at-arms that used to crowd the halls of the barons of earlier days became gradually scattered among the villages as "cottiers," peasantry and yeomen, or small traders and mechanics. These cottiers held half an acre of land or more, and paid rent in kind, the usage varying in different manors: the village carpenter repairing woodwork, the blacksmith repairing armor, etc.; others, less skilled, worked one day a week for their lord all the year round, nutting at one period, harvesting, gathering rushes, supplying fowls, eggs, honey, tending the hounds, etc., but paying no other rent. Others again, holding a small acreage of farm-land, ploughed for their lord one or more days in the week,— finding the oxen,— hauling fuel and the like. These cottiers enjoyed certain rights of common and forest and many of these obligations remain in modified form to the present day.

The lowland Scots were of essentially predatory habits, and were wont to go harrying over the moors of Westmoreland and Northumberland, and the Welsh were ever threatening the western borders of Cheshire. It was necessary, therefore, for the gentlemen of these parts to make their homesteads secure against a possible raid. If a slight eminence rose above the general level, or a favorable bend occurred in the adjacent river, these features decided the location of the proposed house. But when no such suitable position presented itself, the site was usually surrounded by a broad moat, a ditch or a "haw-haw," and admission by draw-bridge was the only means of access.

Stone, as a common building-material, was difficult to obtain in these western countries, and was generally confined in its use to the foundations, the superstructure being usually framed in heavy oak (which was abundant) and the spaces between the timbers filled-in

with wattle and clay, and covered flush with plaster. In Kent, brick is still frequently used for the same purpose. Leland describes Morley Hall as quadrangular in plan, standing upon a stone basement, which rose six feet above the level of the moat, "in the waters of which grew the 'acorus calamus,' a pleasantly scented reed, which was used to strew the floors of the chambers within." The plans of these houses were usually shaped like the letter **E**, and are very characteristic of the period.

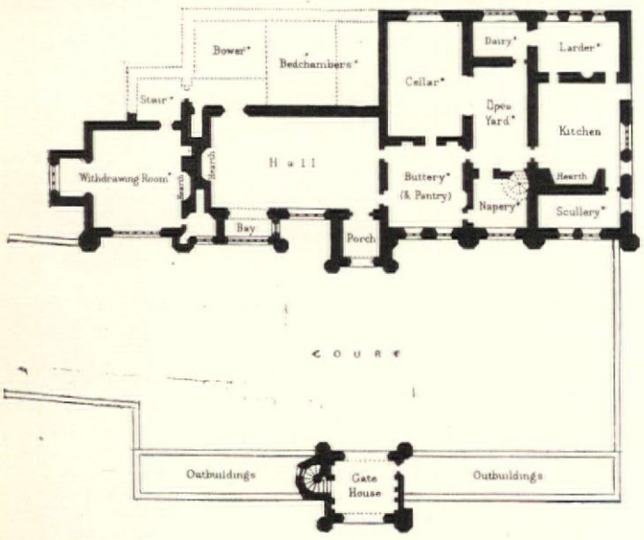
The lords of the manor frequently erected in the midst of the villages shelters called market-crosses, to which the farmer folk could bring their produce for sale or barter, the lord levying a small toll for the privilege. Leland, in his "*Itinerary*," says "these were made all of stone and curiously vaulted for poor market folkes to stand dry when rayne cometh." Chichester, Malmesbury and Northampton are well-known examples, the precursors of the market-halls of the present day.

Although the castles of the Crown, like Windsor and the Tower of London, were fortified and maintained in condition adequate to withstand the artillery of the period, the same necessity as regards private dwellings had ceased to exist, and the defensive works of many of the nobles had been destroyed. The retainers were scattered, and attention was concentrated upon the personal convenience of the owner and his family as it was understood at the period.

The "house-place," as such, is no longer found; the "common hall" remains as a leading feature with its "minstrels' gallery," but the size in all new buildings is much curtailed and the raised daïs of earlier times is usually omitted. A deeply recessed bay-window, at one side (at the daïs end) became a very conspicuous feature, and fireplaces of great size, massive construction and ornate design began to appear. The hall was no longer used as a dormitory, as of old, where guests and retainers slept off the effects of their revels, but was reserved for banquets and other great festivals.

The walls of Westminster Hall are of earlier foundation than the roof, which, with the great windows, was reconstructed at this period. This hall is 290 feet long by 68 feet wide, and the tie-beam construction (which in many smaller cases had given way to the collar-beam and arch-ties, as shown in Canynges Hall) would have seriously marred its grandeur of appearance. The consideration of its great width and the importance of the case led up to a scientific readjustment of the timbers and the development of the "hammer-beam" construction, by which the weights and thrusts were counterpoised and the resultant load securely placed at points in the outer walls, well below the level of the wall-plates. As was their wont, they beautified their salient features of construction, throwing the full height of this masterpiece of carpentry open to view, forming a feature, not only new to the world, but of surpassing grandeur and of wonderful beauty in all its detail.

The roofs over Westminster Hall, Eltham Palace (now a barn), Hampton Court and Crosby Hall, all in the neighborhood of London, are among the noblest specimens of a type of work peculiar to England. In subsequent years this great Hall of Westminster was the scene of great historic events: the trials of Queen Anne Boleyn, Sir Thomas More, the Earl of Strafford, the Earl and Countess of Somerset, King Charles I and others, who were here condemned to death and later beheaded. Here, too, Cromwell was inaugurated as Lord Protector, and the coronation banquets were held under



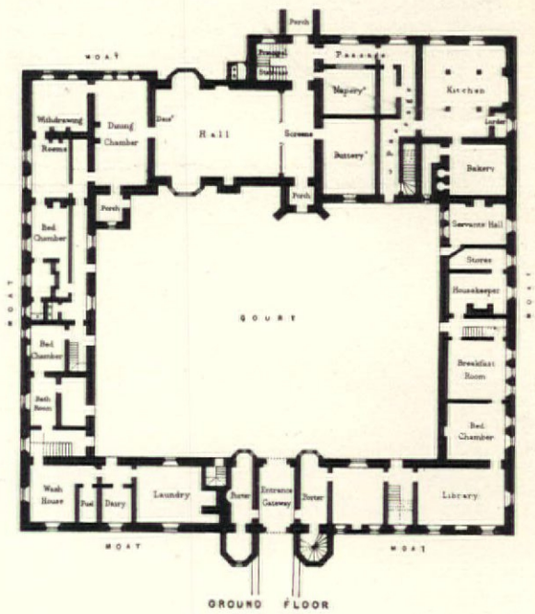
GROUND FLOOR

Wolterton Manor-house.

this great roof up to the time of George I in the early part of the eighteenth century.

Prior to the fifteenth century, flues for the conveyance of smoke from the open fires on the hearth consisted of huge canopies built of wicker plastered with clay and lime, the temporary nature of which accounts for their disappearance from the dwellings of earlier periods. In 1419, that is, during the early part of this period, we find ordinances of the city of London providing that henceforward all new chimneys shall be built of stone or brick, "and not of wood, under pain of being pulled down."

During this period we find the family chambers were grouped by themselves at the daïs end of the hall and, in like manner, that the



Oxburgh Hall, Norfolk.

offices were grouped by themselves at the other end of the hall, approached from the passage formed by the screen. Wolterton House, from Professor Ker's "*English Gentleman's House*," clearly illustrates this point.

Sleeping accommodation and the privacy of the bedchamber became much improved at this time, and the multiplication of rooms in various forms went on. Among the better class of people it became the custom to retire to special private bedchambers, assume a night-dress and sleep between sheets on feather beds. In evidence of this advance in refinement we find in the Ewelwe inventory of 1466 references made to "the great bed-chamber," "my lady's closet," "the gentlewomen's closet," the "lord's chamber," "my lord's outer closet," "washing-closet," "nursery," "wardrobe closets," etc. And we find in other records references to that cumbersome piece of furniture the four-post bed.

It is thus related that Richard III, when travelling, always took his bed with him, or had it sent on before him. In August, 1485 (as related by Hodgson), his servants had thus preceded him with the running-wardrobe and secured the best rooms at the "Blue Boar," at Market Bosworth, near Leicester, where his four-post bed was duly set up. It is described as being richly carved, gilded and decorated, and was constructed with a double bottom of boards. Richard slept here on the night previous to the Battle of Bosworth Field, whereat he was defeated and slain. This bed was subsequently stripped of its rich hangings, but the cumbersome bedstead, itself, remained at the "Blue Boar." In the reign of Queen Elizabeth, about one hundred years later, when the then hostess of the inn was one day shaking the bed she observed a piece of gold fall on the floor; this led to further careful examination and revealed the double bottom, upon lifting a portion of which the interior was found to be filled with gold pieces of the reign of Richard III and earlier. This custom of hiding treasure in beds was common in mediæval times and this circumstance is a side-light upon the habits and customs of the period.

There was a tendency among men of leisure to study and to collect manuscripts, and in the houses belonging to this class we come upon the library as a distinctive feature, as at Oxburgh Hall (from Ker's "*English Gentleman's House*"), which is another good example of the houses of the period.

The staircase now becomes a marked feature; it is still enclosed between walls, and its windows are marked externally at varying levels. Secondary, or private, stairs are also found leading from special rooms or suites of rooms, to secluded gardens, forming valuable means of escape in troublous times.

Glass, in windows, became more commonly used during this period even in the lesser class of dwellings; but it was usually fixed in moveable frames or casements that were deemed the special property of the occupier and are thus referred to in inventories and were no part of the freehold. In previous times framed blinds of cloth or canvas, or linen dipped in oil, called fenestrals, had been in use, though glass was common in the churches and monastic buildings and in the dwellings of the wealthier class.

Architecture. — The social progress is well evidenced in the plans and distribution of the dwellings of the period, but the salient features of the architecture of this fifteenth century are still more distinctive; they are as clearly defined as the Norman and the Early

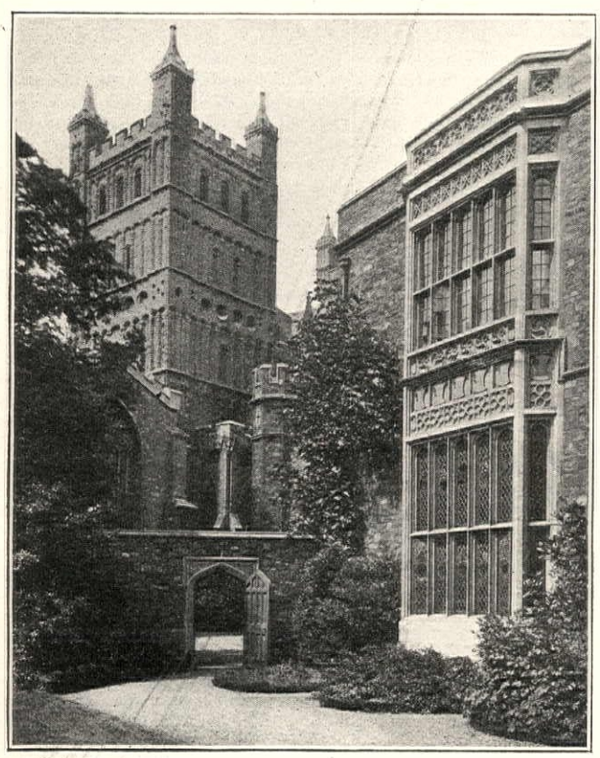
English, and form the grand culmination of the style of architecture of the Middle Ages in England.

The First Pointed, or Early English, represents the birth or inception of Gothic architecture, and is incidental to the thirteenth century. The fourteenth is an epoch of steady growth, gradual improvement in science and art, with a geometric precision in its main decorative features, an amplification and enrichment of clearly-defined ideas. But the *Perpendicular* period of the fifteenth century, while proceeding still on the same lines in the march of progress, evolves out of the tendencies of the age a most striking line of departure. It is known as Perpendicular by common consent, but *Rectilinear* would be a more apt description, as horizontality is as strongly marked as verticality. The departure from flowing or curving geometric lines, and the substitution of strongly-defined rectangular lines, are the most salient features of this period.

Defensive architecture had, as a general rule, ceased to exist; that is to say, the *necessity* for towers, walled enclosures and fortified gateways had given way in the process of evolution. The intrinsic beauty of the old features was too great, too much interwoven with ancestral history and associations, to be disregarded or ruthlessly cast aside; it became, therefore, *idealized*. The *gate tower*, when used (and we find it in the baronial and college halls of the period), formed one of a series of apartments, flanked by turrets as of old, but now marked by wide hospitable doorways, broad mullioned windows and decorative parapets; the old portcullis is remembered only by sculptured reproductions in high-relief as one of the historic associations. The roof has become flat again, but not for defensive purposes; it is approached by the turret-stair, and gives an extensive view over peaceful hamlets, cultivated fields, green meadows — the pasturage of countless herds and flocks; of general smiling prosperity and peaceful security.

The *doorways* (not gateways) were often very much enriched, the deeply-moulded arch was decorated with conventional carving of roses, crowns, *fleurs-de-lis*, portcullises, grotesques, etc. The mouldings were smaller and less vigorous than in preceding periods: small shafts with moulded caps and stilted bases. The outer mouldings were run up square at the sides and over the top, enclosing spandrels in the angles, enriched with shields charged with coats-of-arms, etc. The arches generally were broader in proportion to their height, less acutely pointed, of shorter radius.

The *windows* are of very marked character during this period. In ecclesiastical buildings and in some of the more conspicuous halls, the great windows occupy the whole space between two buttresses, the whole end of a church, the full width of a bay. Not only is their width remarkable, but also their height. They are frequently divided by leading lines or mullions into two or three compartments, and further subdivided, by secondary mullions, into two or three lights

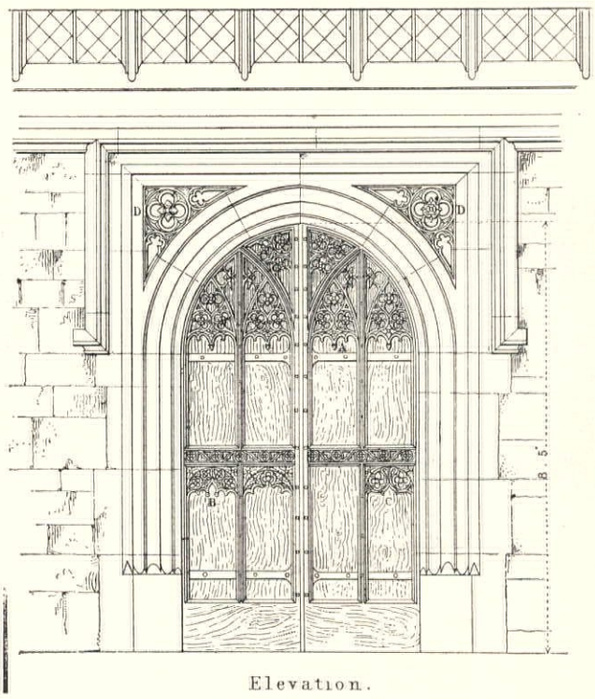


The Deanery, Exeter, Eng.

in each compartment. Not only are they divided up in their width, but in their great height by horizontal transoms, which is one of their special features. In their heads the geometric tracery of the past period is replaced by vertical mullions and horizontal transoms, richly cuspated. The windows in the great churches and halls of England of this period are the grandest and most beautiful specimens of fenestration in the world, and are peculiar to England.

The halls, as at Hampton Court, extend through two stories, and the windows, filled with the richest stained-glass, extend the full height of the hall.

Both in the *stained-glass* and in the carving of the period we find a free use of heraldry. The use of coats-of-arms has already been referred to in treating of the twelfth century. These distinguishing badges, or crests, became the heraldic device and armorial bearings



Elevation.

Doorway: St. John's Hospital, Northampton.

of a family descending, with more or less quartering, through succeeding generations. During this period we find all these salient features of warlike days idealized and the necessities of the past periods became the decorative features of the fifteenth century.

The walls were built more scientifically and with less material than heretofore, the stone facings, inside and outside, being fairly dressed. The plinths were boldly moulded and often panelled, the parapets deeply moulded, the mouldings returned round the embrasures and the face panelled. In fact, superficial panelling, both inside and outside, was one of the distinguishing features of the period, to the extent, in many of the more ambitious buildings, of covering the whole surface of the walls, inside and outside, with more or less intricate panelling, producing a very ornate appearance, as seen in Henry VII's Chapel at Westminster, at Windsor and elsewhere. This same tendency to panelling applies to doors, screens, roofs and to joiner's work generally.

Buttresses became features of great constructional importance. As the walls were built more scientifically, of stone dressed all round, but of less thickness than heretofore, and as the windows were built of greater width, sometimes to the full extent of the space between the buttresses, the whole thrust and weight of the internal construction was concentrated at these points; they, therefore, became more massive and towering; huge counterforts, in fact. They were richly decorated with panelling, niches, canopies and sculpture, as emphasizing their constructional value and importance. The canopies and turrets were mostly octagonal in plan and finished with ogee-shaped domelets, crocketted up the external angles and on the apex, in character quite distinct from anything that had preceded them which had hitherto been finished with straight lines.

In the Midland Counties many charitable foundations were established and endowed as hospitals for the aged poor, as at Leicester, Coventry, Northampton, Bristol, etc. These were built of massive oak framing filled-in flush with wattle and plaster, and many of these earlier half-timbered buildings were of beautiful design and elaborate detail. They are fully illustrated in Dollman's "*Ancient Domestic Architecture.*"

Supremely glorious are these fifteenth-century monuments, and this particular phase of the architecture of the Middle Ages is peculiar to England.

The rapidly increasing wealth of the times led to liberal patronage of the arts, and a certain emulation of display, to great building activity and to extravagance in ornamental detail. It was thus that the architecture in England during the Middle Ages, the mediæval times, rose, by adventitious circumstances, to its zenith, its greatest glory and development, and, for a century or more, it was high noon; but slowly and reluctantly, the sun of mediæval art began to decline. The days of true-art progress, the days of ever striving for fresh forms, more beautiful, more perfectly consistent than had hitherto been developed, gave place to days when the mechanical reproduction of established forms was often made grotesque by the on-grafting

of incongruous features copied from pre-mediæval times, the cumulative result of which was that distinctive style of architecture known as Tudor.

THOMAS C. SORBY.

[To be continued.]

THE BOSTON STRIKE.

"NOTHING could be more unreasonable than the demands of the workmen who have precipitated the great Boston strike. Only on the theory that a labor union's wishes take precedence to all law and that the whole country must, without interest or knowledge, instantly on the demand of a few labor leaders take up a controversy can such a proceeding as that taken in Boston be justified. No other body of men in civilized society presumes to hold up a whole nation for the settlement of petty grievances of a handful of persons. The disproportion of cause and effect is simply grotesque. The whole trouble arises out of an insignificant quarrel between organized labor and a local trucking company of Boston. What the merits of the question originally at issue were we do not attempt to determine. No matter how justly bitter the labor unions may have been against this concern, they were not in the least justified in venting their ill-will on the public at large, as they have done, causing suffering to thousands who never heard of the carting company and are perfectly helpless to influence the struggle.

"Having declared a boycott against the carting company, the strikers demanded that the railroads and steamship lines should refuse to handle any goods brought to them in this company's trucks. Such a demand, of course, could not be granted. The railroad and steamboat companies are common carriers. They are by law obliged to handle the freight that is brought to them. They may dislike the bringer and sympathize with the strikers against him; nevertheless, his right to the equal privileges of public transportation is absolute. It is a right which those who proclaim themselves the special friends of labor are always seeking to surround with additional safeguards. Transportation corporations, it is demanded, must make no discrimination between customers, they must charge the same rates to all, they must favor nobody, whatever his power or his relation to their business. But, if they must favor nobody, they must also punish nobody. If they can refuse to handle one man's goods because he is boycotted by a labor union, they can refuse to handle another's because he is competing with some friend of the railroad managers. If a railroad can do what the Boston strikers demand, a telegraph company can refuse to transmit the messages of any person on the request of his enemy who has influence with the telegraph directors. The next step is to establish the rule that the Post-office Department must close the mails to any person on petition of organized labor. Nor is it much of a step, either. Labor unions have gone much farther in other directions. They have long proclaimed the doctrine that a person under their ban was not entitled to the equal protection of the laws, and declared it outrageous that policemen or sheriffs or soldiers should guard him from violence or save his property from destruction.

"This is anarchy. The Boston strikers are acting just as much on anarchist principles as the men who throw bombs. They are demanding that persons against whom they have a grievance be outlawed and that others be freed from performing their legal obligations towards them. If common carriers may not transport a boycotted concern's goods, may the courts try their suits, may the street-cars take them as passengers, may the fire-department keep their houses from burning down, may the police protect them from assassination if a labor union sees fit to object? There is no middle ground. The lawful rights of every citizen must be respected, even if he is justly hated by organized labor, or else anarchy reigns, and when individual rights cease to be sacred it is always the poor man who suffers in the end. — *N. Y. Tribune.*"

BOOKS AND PAPERS

EIGHT years ago an undergraduate in the civil-engineering course at Ann Arbor chose for the theme of his graduation thesis "Architectural Engineering," handling the subject so well that the attention of Wiley & Sons was called thereto, with the result that in 1895 the thesis, extended and elaborated, was published under the title of "*Architectural Engineering.*" The first edition was noticed in these columns on November 16, 1895. The second edition of the work[1] is now before the public. In a way, it admirably illustrates the fact that the engineering demands upon the architect have vastly multiplied even in the six years since Mr. Freitag's first edition was published. Previous to 1894 Chicago stood first in the construction of high buildings, and the descriptions and examples cited in the first edition were mainly limited to Chicago practice. Indeed, it was customary at that time to speak of skeleton construction as the Chicago system, and the type was not looked upon with a great deal of favor by Eastern constructors, but business necessities have forced a consideration of the special problems involved in high buildings, and the East, particularly New York City, is at present far ahead of the West in the magnitude of its building operations, both up and down. That is to say, the problems of foundations are to-day more complicated in New York than elsewhere and tall buildings have been carried to a greater height in that city than was ever known before. The last six years have also witnessed great changes and improvements in many details of construction, especially in terra-cotta and concrete floors and in all methods of fireproofing. It follows therefore that the work under present consideration is a second edition in hardly more than its title-page, for so much new and different matter had to be incorporated and considered that the practical rewriting of the book was inevitable. The number of pages has been increased from 239 to 407. The illustrations are drawn from all over the country rather than from Chicago, the New York methods receiving special attention. The greatest fault we would find with the work is that the original edition was not entirely discarded and the whole volume rewritten. It would have gained immensely in clearness and preciseness. The old material crops out conspicuously in places, and the illustrations are distributed in such manner as just not always to agree with the text. But this, after all, is not especially material. The real value of the work is beyond question and it easily leads in its class. We know of no one book which can be so thoroughly commended for both the beginner and the experienced practitioner.

While the title is comprehensive the real discussion is practically limited to the tall steel-constructed office-buildings. The modern office-building presents almost, if not quite, all the problems involved in architectural-engineering. The arch has practically ceased to be a constructive member. It might almost be added that we have ceased to place any special reliance upon masonry as a supporting member, so that a modern building resolves itself practically into a foundation and a steel cage. Therefore the author is quite right in limiting his consideration to this type of building, and occupying the bulk of the volume with considerations of steelwork.

The chapter on columns is of especial interest. This is the one feature of building-construction about which we are to-day the least informed. We continue to use Gordon's formulas and the rules-of-thumb given in the Carnegie tables, and the fact that they answer most requirements is because they are really based upon the results of tests. But even in this respect our information is limited. There is an almost complete absence of definite data in regard to the ultimate strength of actual columns. Tests on short lengths of slight sections have an undoubted value, but they are not conclusive, and it is to be greatly regretted that it is not possible to institute a series of investigations which would give us data as conclusive in regard to columns as the investigations of men like Professor Lanza have been as to beams and girders. It is always a satisfaction to calculate a girder. One has a feeling of absolute confidence in the results which is quite lacking in the computation of a column. The radius of gyration is a convenient expression which covers a vast degree of ignorance, and until we can get down to a more basic scientific formula we have to be content with rules of-thumb. Mr. Freitag's discussion of column-loading, to our mind, in a degree misses the actual mark. He cites one instance of eccentric loading in which the statement is made that a cast-iron pillar 10 inches in diameter and 11.9 feet long will break under a centre-load of 32,000 pounds per inch of metal area, while if the load is placed one inch to one side the unit resistance is reduced to 21,150 pounds, and a difference of only one-half an inch off the centre-of gravity gives a reduction to 26,050 pounds. These are interesting figures, if true, but without questioning Mr. Freitag's good intent we frankly do not believe they would be substantiated by practice. In our own experience we have seen it proved repeatedly that a slight degree of eccentricity makes no appreciable difference in the strength of the column, and reasoning from practical considerations it would seem far wiser to systematize and balance our loads rather than to undertake the extremely uncertain problem of designing columns especially for eccentric loading.

The author takes up quite exhaustively a topic which we are always interested in seeing discussed and about which a great deal has been written of late years, but which is so intangible that it leaves possibilities for wide differences of opinion. We refer to the subject of wind-bracing in tall buildings. While we know that the wind does blow and blow hard, we have not, however, actual observations that will tell us to what extent a recorded wind-pressure at one point is exerted all over a side of a building, and therein lies the difficulty of rightly solving the problem. The admirable investigations made by Mr. Julius Baier on the St. Louis tornado and its effect on buildings constitute perhaps the most important addition to the literature upon the subject. All of this is carefully considered by Mr. Freitag, who very rightly, we believe, errs on the side of safety, and yet he places far more insistence upon a possible wind-strain than would seem in our judgment necessary. Applying the formula of the United States Weather Bureau, $P = 0.004\,V^2$, to the extreme velocity recorded in the St. Louis tornado, gives a pressure of 60 pounds per foot. The maximum velocity ever recorded in New York lasted only two minutes and resulted in a pressure of only $22\frac{1}{2}$ pounds per foot. And yet the engineers would tell us that we should assume not less than 30 pounds per foot, and should transmit every pound of this strain directly to the steel frame, disregarding the masonry walls, and that the resulting stresses on the structural members added to the stresses from the constructive and live loads should not be more than one-fourth of the ultimate resistance of the metal. Mr. Freitag assumes that the floor construction can be counted upon as sufficiently rigid to transmit the horizontal shears due to wind, and yet he is not willing that any reliance whatever should be placed upon the resisting factor of the masonry walls and partitions. And this notwithstanding his admission

[1] "*Architectural Engineering.*" With Especial Reference to High Building Construction. By Joseph Kendall Freitag, B. S., C. E. Second Edition. New York: John Wiley & Sons. 1901. Price, $3.50.

that most careful observations on the deflection of tall steel-skeleton-construction buildings in Chicago tend to show that any actual deflections in well designed and carefully constructed buildings, even under very heavy winds, are far less than any theoretical assumptions. No amount of argument except actual experiment will ever convince us that any plate-glass window of even moderate dimensions is capable of resisting a direct thrust all over its area of 30 pounds an inch, and though recorded velocities and even recorded pressures may give high readings at isolated points we have yet to see any facts which would show that such pressures or velocities are due to more than relatively fitful gusts which operate against only isolated portions of a building. The building-law of New York allows the working-stresses from wind-strains to be increased 50 per cent over what is permissible for other loadings. But where the metal, even under such conditions, is not loaded to anywhere near its elastic limit, we fail to appreciate any evidence that would make us hesitate to assume a wind-pressure in a tall building of not over 10 pounds a foot, and we doubt very much whether even that would actually exist. This is a subject which offers a fruitful field for discussion, while we have regarding it a dearth of real knowledge.

The chapter on spandrel sections is a very clear presentation of a feature of steel-construction which is often neglected. The facts are put in very usable form and the best practice is illustrated and explained. There is also an admirable discussion of the use of column sheets in making calculations, with a number of illustrations from typical buildings. The proper tabulation of computations, presenting the figures in such way that when the problem is an old one the process of calculation will not be forgotten, is a factor of considerable importance. We could wish that Mr. Freitag had seen fit to apply a similar process of formulation to beams and girders, which are not considered at all, though quite as important in their way as the column tabulations. In a work which covers so wide a field, however, it is natural that there should be some slips, as for instance when in the formula $p = 17{,}100 - 57\frac{l}{r}$ the value of l is said to be in feet, while r is in inches. Again, the writer makes the interesting statement that in Boston piles are used almost exclusively for foundations, which will be news to Boston architects. And on page 187 the statement is made that for openings in walls where beams or members are supported directly by the walls the load generally assumed to be carried in masonry of usual bond may be represented by a triangle whose base equals the clear span and whose height equals one-third of the span. A brick wall will, of course, bond itself over an opening, but it does not seem to us good engineering practice to depend upon such bonding, and it certainly is not so considered by many constructors. But these are, after all, minor defects of relatively slight importance and can easily be corrected in what we hope will be a subsequent edition. The work as it stands is so thorough and complete that it disarms criticism, and even taking into account the local character of the first edition, in its present form it is certainly standard.

A VERY excellent little book [1] is Mr. Leslie Waterhouse's "*Story of Architecture*," one of a series called the "*Library of Useful Stories*," perhaps rather unwisely.

"The waters of the Nile are the head-waters of architecture," says the author not inaptly; and from these head-waters spring all the great rivers and small rivulets and brooks of Greek, Roman, Mediæval, Renaissance and modern architecture — if such a thing as architecture exists in the modern sky-scraper. Certainly, if architecture arose, as it seems to have done, in the earlier centuries from the religious faiths of nations, the hideousness of modern houses may be accounted for, as there is certainly no faith shown forth in them, religious or otherwise. "Nothing reveals the character of the nation so clearly as its religion; nothing has a more permeating influence upon its architecture." And thus the Egyptians, being not only a religious people, but having a vast number of deities, planned their temples upon the grandest scale. When one thinks of the Great Pyramid occupying 13 acres, or twice the extent of the foundations of St. Peter's at Rome, some idea may be formed of the stupendous character of Egyptian buildings. Its height is 481 feet, that is, 57 feet higher than the spire of Salisbury Cathedral; and it has been said that it would occupy the entire space of Lincoln's Inn Fields, London. Such vastness is lost in the desert; but could we erect a temporary pyramid in any of our great cities, we should then gain a fair idea of the stupendous grandeur of those early builders of 3700 B. C.

Mr. Waterhouse's summing-up of the French-Gothic churches (by the way, he insists upon the folly of the term Gothic, although we must bear it for want of a better, equally comprehensive, and compares Amiens with Salisbury, both being about the same date. The height of the nave of Amiens is almost double that of Salisbury, 140 feet and 84 feet, respectively); and the height of the *flèche* is nearly that of Salisbury spire (424 feet), hence, the meanness of the interior of the English church as compared with the French one. The richest feature of French cathedrals is the deep recessed porch, so superior to the English doorways. The earliest Pointed arches in England appeared at Malmesbury and Kirkstall Abbeys. The superb beauty of Canterbury and Westminster is due, probably, to a French architect.

The peculiar character of the English chapter-houses, the circular or polygonal plan, with a central column from which ribbed groining springs was first adopted at Worcester, the earlier chapter-houses having been square or oblong, as at Bristol and Gloucester.

Mr. Waterhouse speaks of Köln as the "finest of all" Gothic churches, to which we may be allowed to demur. It is, no doubt, of French plan, but surely many of the cathedrals of France are far more impressive and beautiful. At page 164, the author cites Köln (Cologne he calls it) as the "largest of all Gothic cathedrals, with the single exception of Seville"; while at page 158 he gives Milan as "the largest of all mediæval churches, except Seville."

Considering that the little book contains but 207 pages, and gives the whole story of the growth of architectural plans, forms and details, it is not too much to say that very little, indeed nothing, of any importance to the young person or the full-grown amateur is omitted. It is just the sort of book one wants as a text-book for the young, and a concise and instructive handbook for others. There is not too much of a technical nature, but architectural terms are not omitted; and any one mastering its contents need not fear being superficial, even if he goes no farther; but the book would form an excellent foundation upon which to build a more elaborate knowledge of architecture culled from Fergusson, Parker, Statham and others. Of course, it is not intended for professional architects.

[1] "*The Story of Architecture.*" By P. Leslie Waterhouse, M. A., A. R. I. B. A. With 59 illustrations. London: G. Newnes. 1*s*.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES POST-OFFICE, CRESTON, IA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

DETAILS OF PORTICO OF THE SAME BUILDING.

HATFIELD HOUSE, ENGLAND.

THE TOWER OF LONDON.

[The following named illustration may be found by reference to our advertising pages.]

HOUSE IN THE RUE OCTAVE FEUILLET, PARIS, FRANCE. M. ARNAUD, ARCHITECT.

THIS plate is copied from *La Construction Moderne*.

[Additional illustrations in the International Edition.]

SMITHELL'S OLD HALL AND CHAPEL, LANCASHIRE, ENG.

THESE subjects are copied from *Building News* in illustration of the paper on "Domestic Architecture in England" elsewhere in this issue.

HOUSE OF HERR GLADE, WILMERSDORF, NEAR BERLIN, PRUSSIA. HERR ERICH PETERS, ARCHITECT.

THESE illustrations are copied from *Deutsche Bauzeitung*.

THE CITY MUSEUM, ALTONA, PRUSSIA. HERREN REINHARDT & SUESSENGUTH, ARCHITECTS.

THIS and the following plate are copied from *Zeitschrift für Bauwesen*.

CENTRAL PAVILION OF THE SAME BUILDING.

HOUSE OF THOMAS NELSON PAGE, ESQ., WASHINGTON, D. C. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

HOUSE OF PAUL L. FORD, ESQ., NO. 37 EAST 77TH ST., NEW YORK, N. Y. MR. HENRY RUTGERS MARSHALL, ARCHITECT, NEW YORK, N. Y.

ENTRANCE TO THE SAME HOUSE.

NOTES AND CLIPPINGS

THE DIMINUTION OF THE RED-CEDAR SUPPLY. — Reports from Puget Sound show that the supply of red cedar suitable for shingles is becoming smaller every year and that the manufacturers will soon have to go to Alaska for cedar logs. New appliances have so greatly increased the output of mills that last year 5,000,000,000 shingles were cut in Washington and Oregon. Good cedar logs command $9 a thousand feet, and the supply is short at this price. — *N. Y. Evening Post.*

English Borough of Bermondsey lighted by Garbage.—There was a large gathering at Bermondsey Town-hall, according to the *London Times*, when the borough opened the new electric-lighting and dust-destructor works which have lately been brought to completion by the Bermondsey Borough Council. The new works are situated in Spa Road, at the rear of the Town-hall and public baths, and they occupy an area of about 1½ acres. The buildings consist of a destructor-house, an engine-room containing the generating plant, a pump and fan room, an accumulator-room and offices. The destructor-house is specially designed with the view of giving adequate ventilation. It consists of six cells, each having 26 square feet grate-area, and capable of destroying fifty tons of refuse in twenty-four hours. The refuse to be destroyed is brought in by the collecting-vans, conveyed along an inclined roadway to a tipping floor at the back of the destructors, and discharged into spacious bins placed over the tops of the cells, from which the latter are fed as required through rectangular shoots. After passing through the shoots the refuse is deposited on a hearth at the back of the furnace, and is there thoroughly dried before the actual burning takes place. By these means the refuse is rendered more combustible and the vapors which are given off become innocuous by being passed over the hottest part of the furnace. The gases from the cells pass out at the front and come into contact with the boiler-tubes, and are thus utilized for the purpose of raising steam. Each cell and boiler furnace is fitted with forced-draught apparatus. In deciding the system of distribution most applicable to Bermondsey, the engineers had under consideration the fact that the district is very concentrated and is filled with factories and workshops, and that the most favorable opportunity occurred for supplying electricity during the daytime for motive-power purposes. The alternate-current system was therefore not deemed so suitable as the continuous-current, which has been adopted. The plant at present installed in the generating-station consists of three multipolar generators. Two sets each have an output of 150 kilowatts at 480 to 520 volts, and the third set an output of 75 kilowatts at 480 to 520 volts. There are also installed in the station a balancer and a battery-charging motor booster. The battery, which consists of 280 cells, is capable of giving a discharge of 83 ampères at 510 volts for six hours, or on an emergency 300 ampères for one hour. The switchboard is an interesting construction, and is mounted in a wrought-iron frame. It consists of panels of polished black enamelled slate. The board has been designed to control three dynamos, six feeder-circuits, eight arc-circuits, the Town-hall, the depot and station lighting-and-power circuits, the storage-battery, the balancer, and the battery-charging motor booster. In the borough the three-wire system of mains has been adopted, and the feeder-mains are at present four in number. With regard to the public lighting, there are at present 71 standards erected, supporting ten-ampère double-carbon arc-lamps and incandescent-lamps. At twelve o'clock every night the arc-lamps are permanently turned out and the incandescent-lamps are lighted. The new stables, when completed, will afford accommodation for sixty horses. At present only fifty-four stalls are fitted up. The new depot also includes workshops, stores, offices and other buildings for municipal purposes. Mr. T. Cox, Chairman of the Electric-lighting Committee, who presided, stated that the charge for electric-lighting would be twelve cents for the first hour and six cents for each hour afterwards, based on the minimum-demand system. For motive-power purposes the charge would be five cents per unit. He remarked that the question of the disposal of the residuum from the destructor had occupied the attention of the Council, and an electrically driven hydraulic plant for the manufacture of flags from a portion of the clinker had been laid down. That machine would turn out flags at the rate of twenty-five per hour at a very low cost. The clinker was ground very fine, mixed with a due proportion of cement, thoroughly incorporated, and then subjected to a pressure of 1,000 pounds per square inch and afterward allowed to dry.

A Pacca Law suggested for France. — The Paris *Chronique des Arts* protests against the sale of ancient French art-works to foreigners, and advocates the passing of a law similar to that now in force in Italy forbidding the export of any art-work exceeding $1,000 in value and 100 years in age. It instances the sale recently of a rare specimen of old wrought-iron, a screen of eighteenth-century work that stood in the choir of the Trèves Cathedral, which came originally from the church at Clairvaux. The cathedral authorities, needing money for a new heating-apparatus, put it up at auction. The town, wishing to save it, carried the bidding to $2,800, when a rich American, name not given, bid $2,900 and got it. It is also said that many French châteaux and churches have been robbed of carved wood, stone and iron work by foreigners, and the *Chronique* foresees the day when America's superiority over the Old World in the possession of money will lead to wholesale despoliation, unless a stringent law is passed against such sales.

What is a Block? — In the talk of New York the word seems most commonly to denote a distance — the stretch of one street lying between two intersecting streets, or, north and south, in the numbered streets, the twentieth of a mile. When the phrase has any other meaning, real-estate men, at all events, feel constrained to qualify it by the boundaries of the property. Here the distinction has slight importance, but in Chicago the precise meaning to be attached to the word has lately been the decisive factor in determining the efficacy of the local-option laws, which certain districts of that city enjoy. According to the law, a saloon or dram-shop may not be established in any block without the consent of the majority of the property-owners in that block. The liquor-dealers naturally chose to interpret the word as an expression of distance, and when they had obtained the consent of a majority of the property-owners on either side of that portion of the street between two intersecting streets on which they proposed to open up, they professed to have done all that the law required. The different municipal authorities, with the coöperation of sundry municipal associations, opposed this interpretation in the courts, setting up the contention that a block was a tract of land bounded by four streets, and that in order to comply with the law, the liquor dealers would have to obtain the consent of a majority of property-owners upon each side of the streets which bounded the block. In the lower courts the saloon-keepers won, but, on appeal, the Supreme Court of the State of Illinois has lately decided that the contention of the city and of the protective associations is correct, adding that a dram-shop affects the value and character of all the property in the block in which it is situated, and that "to hold under the ordinance in question that the consent required was only from the property-owners on each side of the street in which the dram shop is kept, instead of each side of the streets surrounding the block, would manifestly lead to absurd results." Under the terms of this decision, a number of beer-gardens in the residence district will be obliged to close up, and as the ordinance was widely copied by smaller municipalities throughout the State, the final interpretation of the phrase is likely to have far-reaching results. — *N. Y. Evening Post.*

A Draughtsman's Ring. — An Englishman has invented a writer's or artist's ring. The ring carries a small steel ball, so placed as to revolve freely in any direction. With the ring on one's little finger, so that the ball is at the point of contact with the paper, almost every bit of friction in the movement of the hand upon the writing or drawing material is removed. — *Exchange.*

Niches. — The abundant use of statues by the Romans led to the adoption of the niche — a feature unknown in Greek architecture — as a convenient mode of inserting them within the surface of walls and thereby decorating them; at the same time space was gained in interiors where, if otherwise placed, they would have taken up room. Niches frequently occur in Roman temples and baths, and were occasionally decorated with a frontispiece of small columns, with their entablatures and pediments, but were generally left plain, and were for the most part semicircular in plan, in which case they usually terminated in an arch and semi-dome, after the manner of a tribune, or large recess, of which the niche was, in fact, a miniature copy. Niches, however, were very frequently rectangular in plan, and were also *exedræ*, or recesses, in which case the latter formed arches vaulted hemicylindrically. — *Stone Trades Journal.*

Some eccentric Railways. — As the iron track is bound to force its way into most corners of the world, it is not surprising that some lines of railway exist which are striking evidence of a singularly bold conception carried out in the face of obstacles which seemed almost insurmountable. Sometimes the route of the future line lies across a desert; then the great law of the "compensation of nature" seems to make itself felt, for to balance the saving of time and money due to the fact that long tunnels will not have to be cut through hills or mountains the engineers are confronted by the total absence of three essential elements of construction, namely, wood, iron, and water, which have to be transported along the newly-laid line as it stretches its slow length across the desert. Russia's Trans-Caspian Railway, now know as the Central Asian Railway, was built under these conditions; thousands of logs of timber were needed, and the region traversed cannot boast of a single tree for more than 700 miles. This timber was required for building the long bridge, two miles in length, over the River Amu-Darya. This bridge was always the weak point in the highly important railway, and it has been replaced recently by a stone bridge. Between Merv and Charjui the line had to be carried over shifting sands 64 feet deep. When the work is being carried out in such regions the trains become a little town on wheels. They are composed of two-storied wagons, which contain sleeping accommodation, butchers' stalls, canteens, grocers' stores, and forges. As the Trans-Siberian Railway grew in length it was resolved by the authorities that the workmen should have their own "church car." A wagon was fitted up accordingly as a church, with a little peal of bells in the alcove above the entrance. The romance of mountain railways by no means ends with their construction, and travelling upon railways at a very high altitude is not a thing to be desired. The Peruvian line running from Callao to Oroya has a twofold claim to distinction; it is built at probably the greatest altitude of any existing railway, namely, 15,906 feet above sea-level, and it affords travellers certainly the most unpleasant "expérience de voyage" that can be imagined. As the result of travelling at such an altitude, the passengers begin by feeling great oppression, accompanied by pains in the head and limbs; these are quickly followed by bleeding from the nose and mouth, and then by momentary blindness. It is gratifying to know that there is a certain variety in the effects produced upon passengers at this point. Thus, while some persons are seized with giddiness, others entertain strange hallucinations, and others faint away; the last class become so weak that any undue exertion on their part often proves fatal. But this is not all that one has to undergo on the Callao and Oroya line. In due course the skin becomes irritable and sores break out, while the lips swell and then crack. On one of the Trans-Andes railways the passengers have to enter the train in a most peculiar and probably unique manner. The line referred to is that in the port of Mollendo, in Peru. The line starts from the quay-side, and the traveller can pass from the boat into the train. Unfortunately the boat cannot be brought completely alongside the quay. Disdaining the usual gangway, Peruvian ingenuity hit upon a very novel idea. Two large uprights, with a strong cross-bar, were erected on the quay, and from the cross-bar hangs an ordinary trapeze. The passenger wishing to land has to seize the bar of this trapeze; a few sailors surround him, and, when he gives the word, they unite in hurling him into space over the ship's side. One such "send-off" is quite enough, for with one swing the traveller comes to land in the outstretched arms of the railway porters. It is only right to add that both the sailors and the porters evince an amount of energy, delight, and dexterity quite equal to the nervousness of their victims. — *London Globe.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXV SATURDAY, MARCH 29, 1902 No. 1370

CONTENTS

SUMMARY: —

Observations on the Course of the Park Hotel Fire. — The misleading Recommendations of Lay Observers. — The Utility of Compartment Building, as a Safeguard against Fire, as practised in London but not in Paris. — Damage caused by a Landslip in the New York Rapid Transit Tunnel. — The St. Louis Exposition and the Municipal Art Exhibit. — The Planning of new Streets by the City Engineer at Elberfeld, Germany. 97

THE EMPEROR'S SUMMER PALACE. 99

LETTER FROM PARIS. 101

THE LATEST FROM THE ROMAN FORUM. 103

ILLUSTRATIONS: —

Boulevard Entrance to Gorden Park, Cleveland, O. — The Hatch Library, Adelbert College, Cleveland, O. — Details of the De la Montagna Mausoleum, Cypress Lawn Cemetery, San Francisco, Cal. — St. Paul's Church, Nantucket, Mass.

Second-prize Design for City-hall, Riga, Russia.

Additional: The Pont Alexandre III, Paris, France: Two Views. — The Pont des Arts and the Palais de L'Institut, Paris, France; — The Pont Neuf, Statue of Henri IV and the Panthéon, Paris, France. — The Pont de Garabit, Cantal, France: Two Views. — The Pont de L'Alma, Paris, France, and Buildings of the Paris Exposition of 1900; — The Pont au Change and the Conciergerie, Paris, France. — Public School No. 166, New York, N. Y. — Entrance to the Same. . 103

NOTES AND CLIPPINGS. 104

WE will call to the attention of subscribers to our International Edition that the current issue is, for the present at least, the last one that will be sent out in the familiar form it has borne for so many years. We shrink when we picture to ourselves the number of times that during the coming weeks we must give special explanation to subscribers who have happened not to observe our repeated warnings and so find themselves obliged to demand an explanation of the apparent substitution of the copies of the Regular Edition for the International Edition to which they have subscribed.

MR. EDWARD ATKINSON corrects our account of the fire in the Park Avenue Hotel, in New York, and sends us a copy of the extremely interesting report of it which he made after personal examination and inquiry. It seems that the heat from the burning armory, one hundred and ten feet away, did not even crack a single window on the side of the hotel exposed to it. Two men in the hotel opened a window, and sparks from the armory blew in, and set fire to the curtains; but the window was closed again, and the blazing curtains extinguished, without any communication of the fire to other rooms; and it seems most probable that the fire in the hotel was simply simultaneous with that in the armory. Possibly a spark from the armory may have floated into the elevator-shaft, but a dry bearing in the elevator-machine at the foot of the shaft, or a short-circuited electric-wire, would fully account for all the phenomena. However it may have been kindled, it is certain that the fire began in a brick elevator-shaft, at the bottom of which was an hydraulic motor. The motor chamber was sheathed with wood, but the walls of the shaft above the basement showed only the bare brickwork. There were, however, windows in the shaft, on every floor but two, looking into the courtyard, and a wooden platform spanned the shaft at every window, to facilitate washing the glass. On the side toward the hall there were the usual wooden elevator-doors, with glass in the upper panels. The platforms in the shaft were more or less burned, the upper ones more than the lower, showing that the fire gathered intensity as it ascended. There seems to have been no skylight at the top of the shaft, to draw the flames inward and upward, and the wooden platforms acted as deflectors, throwing the fire against the windows in the shaft, and the panes of glass in the elevator-doors, all of which were broken. It is a most significant circumstance that, except the breaking of these windows, and the burning of the platforms, hardly any injury was done to the building, the sad loss of life having been due almost wholly to the smoke. The fire grew more intense as it proceeded upward, and the highest flight of stairs, which was principally of wood, and was very near the shaft, was destroyed. The other stairs, which were of iron, were uninjured, and not a single door from the hall to the rooms was burned through; yet the smoke which came into the rooms through the crevices, and, in some cases, through the open transoms, was sufficiently dense to suffocate their inmates, and, in the hall itself, it was, of course, impossible to live. As the building is constructed almost entirely of iron and masonry, with brick partitions and floor-arches, the smoke which proved fatal to so many persons came mainly from the burning of the carpets and furniture, and the flames from the elevator-shaft, which was practically a blast-furnace, one hundred and thirty feet high, were so intensified as to burn very rapidly whatever they could reach. In this way a book-case, filled with books, standing in the corridor of the upper story, was so completely and quickly destroyed that not a trace was left, even of the books; and in the story below, the furrings and laths on the walls, which were furred and plastered on wooden laths, in the old-fashioned manner, were consumed, down to the brickwork. In the other stories, the fire seems to have fed mostly on the varnish of the woodwork, and the carpets, with their cotton linings. The resistance of the painted wooden doors of the rooms, even in the upper stories, to heat so concentrated is remarkable, but they were all set on the room side of the thick brick partition wall, and, consequently, were deeply recessed, and this is not the first time that it has been observed that a quantity of air, imprisoned, so to speak, in a recess, and thus prevented from circulating, is a very effective shield against fire. If the doors had been covered with metal, and the transoms glazed with wire-glass, the occupants of the rooms might, with full confidence, have closed the transoms, and put their heads out of the windows, to get fresh air to breathe until the fire in the hall should be extinguished; but it is not wonderful that with nothing but unprotected wood and thin glass between them and the flames which they could see through the transoms, some of the guests should have lost their presence of mind. The moral of the whole sad story, like that of so many similar ones, is that, however fireproof a building may be, the people in it may at any time be suffocated by smoke from burning curtains, carpets, furniture or varnished woodwork; and that these must be eliminated so far as possible from halls and open places in hotels, or, at least, protected by sprinklers.

A LETTER to the Boston *Transcript* on methods of building for protection against fire, while excellent in intention, contains so many mistakes and misapprehensions as to deprive it of much of the influence that it ought to have. The writer after saying that the Park Avenue Hotel in New York was "totally destroyed," because it was "not properly constructed, every air-space being open for the spread of fire and smoke from the cellar to the roof, and no protection whatever to the elevators," goes on to argue that buildings should be "divided and subdivided," to "prevent the instant spread of flames and smoke, now possible throughout the entire structure," and that fireproof shutters should be applied to outside windows. In confirmation of the value of these precautions, the writer quotes the example of Paris, where the compartment system has been in use, he tells us, "for many years."

AS a matter of fact, the Park Avenue Hotel, which the writer holds up as a warning, was perhaps the most perfect example in this country of the application of the compartment system. Not only were all the floors of iron and brick, but nearly all the partitions between the rooms and halls, and between the rooms themselves, consisted of brick walls, and the elevators and two of the stairways were enclosed in brick walls, and the consequence of this solidity of construction was that the fire which caused the death of several people in it, instead of "totally destroying" the building, did very little injury to it. Mr. Edward Atkinson's report of the fire says that "no exterior damage was done," not a single pane of glass on the street-fronts was even cracked, the stairways were uninjured, except the topmost flight of one of them, and the fire, if we understand the report, did not make its way into any of the rooms, being confined entirely to the main hall; and the deplorable loss of life was due entirely to the smoke, which filled the hall and stairways so that they could not be used, and

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

penetrated into the rooms, through the crevices around the doors and transoms, in such volumes as to suffocate people who were as safe from actual burning as if they had been a mile away. The *Transcript* correspondent, like so many other newspaper writers, is also in error in speaking of the "compartment system" of building as being particularly well understood and practised in Paris. While dwellings in Paris are usually divided by partitions of masonry, and floors are filled-in with plaster rubbish, the great stores there are striking examples of the lack of the precautions which our architects and fire-engineers consider necessary. In similar stores in London real subdivision is practised, and the shopper at any of the great department-stores on Regent Street or Oxford Street is sent through an endless succession of narrow doors in heavy brick walls, or through tunnels under the streets, to find what he wants. Most Americans, comparing the insignificant appearance of these strings of little rooms with the splendors of Siegel & Cooper's, or Macy's or Wanamaker's stores, imagine that the English are too penurious to pull down a whole row of old houses to build in their place an imposing establishment, and, therefore, content themselves with cutting little holes between the old buildings, and utilizing them without further alteration; but, whatever may be the origin of the English system, it offers great security. In Paris, on the contrary, vast spaces, open to the roof, and filled with combustible goods hung, piled and spread wherever there is a place for them, are as common as they are in New York, while automatic-sprinklers and similar appliances used in such places in this country are practically unknown. The French are habitually careful, and it is through this circumstance, much more than on account of their superior skill in construction, that great conflagrations are rare, not only in Paris, but on the Continent generally. It is probable that the habit of caution in regard to fire, which is carried so far that, in the forests belonging to the city of Heidelberg, it is forbidden even to throw a bit of paper on the ground, and much more to light a match, originates in neighborhood liability of every house-owner or tenant for damage from fire spreading from his premises to others, which is almost universal on the Continent. A man who has to pay for the actions of a fire originating on his premises, exactly as if it were a pet dog which he allowed to get out and bite his neighbors, finds it for his interest to keep his fires and his vicious dogs within bounds; and, insensibly, the habitual construction in France, Italy, Spain, Austria and Germany has become one adapted to confining fire to the room in which it originates. In the simple precautions by which this end is attained the Continental builders of dwelling-houses have become more and more expert, and, as it seems to us, a similar system would, in time, lead to the same result here.

THE operations on the New York Rapid Transit tunnel have been unfortunate in their results. Within a few weeks after the terrible explosion of dynamite which nearly destroyed the Murray Hill Hotel, the sides of the excavation in Park Avenue, between Thirty-seventh and Thirty-eighth Streets, which was supposed to be in solid rock, and was therefore not braced, suddenly gave way, allowing the soil to escape from beneath the foundations of several of the neighboring houses, letting the front walls of three of them fall. Unfortunate as the accident was, it seems to have been one of the casualties which could not have been foreseen. The whole neighboring region is a mass of rock, a sort of "bastard granite," as the contractors call it, slightly stratified. The stone is hard, and generally sound, and is constantly used for foundation work in the upper part of the city, so that, although the tunnel excavation was about forty feet lower than the cellar floors of the houses, anything like a "slip" would seem extremely improbable, if not impossible. As it proved, however, some unfavorable dip of the stratification, or, possibly, some water-bearing seam, favored a movement in just the direction in which it could do the most damage.

SO far as can be judged from the daily papers, there seems to be a little doubt whether the St. Louis Exposition will really be held next year. The disastrous financial failure of the Buffalo Exposition, followed by the disappointments of that at Charleston, have discouraged some, at least, of the St. Louis people, and it is argued, not without reason, that a postponement for a year would not only make it possible to organize the affair more carefully, but would give the public a chance to recover a little of its appetite for international shows, which now seems to be suffering from surfeit. Whenever the Exposition is finally opened, the Municipal Art Exhibit is likely to be one of the most interesting things in it to architects and engineers; and we may as well remark here that it is to be hoped that architects and engineers who want to see it will be enabled in some way to find it. As our readers remember, a splendid display of American municipal engineering work was made by the city of Boston at the Paris Exposition of 1900, but, perhaps because it did not fit accurately into any one of the official divisions of the exhibition, it was almost impossible to find it. As municipal art is neither a fine-art, like painting and sculpture, nor a branch of engineering, like sewers and tramways, nor a form of education or of public charity, it has no definite place in the usual scheme of exposition classification, and must be made conspicuous in its own way.

AS laid out by Mr. Albert Kelsey, who is, apparently, entitled to the honor of having first prepared the definite plan, the Municipal Art Exhibit is to occupy a circular space, surrounded by a boulevard, planted with trees in the most approved manner. On a square adjoining the boulevard is the railway station, and from this a paved street extends in a straight line to the "plaza," which occupies the centre of the model town. Around the plaza are arranged the court-house, town-hall and post-office. From the plaza radiate other streets, and special districts are set apart for "amusement" and "educational" centres, furnished with model theatres, school-houses and libraries. Possibly a model tenement-house may be shown; and it is likely that some of the accessory services of the Exposition, such as a hospital and fire-station, will form a part of the model city. In the way of detail, it is proposed to show different street sections, systems of sewerage, lighting and the other municipal services on the perfection of which the comfort of dwellers in cities so greatly depends; while as much as possible will be done to bring together beautiful suggestions in design, grouping and arrangement, not only of buildings, but of fountains, monuments, bridges, park planting, lamps and so on. It is hoped that a Congress of Public Art, like those of Brussels and Paris, and the one to be held this spring at Turin, may be called at St. Louis, and, if this is done, the Model City will form the most interesting exhibit yet shown on such an occasion.

AN idea of the great advance which has been made in artistic street-designing in Germany may be derived from the plan of the new suburb of Elberfeld, made by the city engineer of Elberfeld, in consultation with the city engineer of Cologne, and published in the *Deutsche Bauzeitung*. It seems that a majority of the proprietors of a tract of surburban land, by applying to the city authorities, may have a plan made for developing it, which will be carried out if they desire it. In this case, the owner of a hilly tract, southwest of Elberfeld, determined upon improving it, and employed private talent to make a plan, which, it is needless to say, showed the territory divided by straight streets, at right angles with each other. Luckily, they found reason to be dissatisfied with this scheme before they attempted to carry it out, and applied to the city engineer, who set himself at work to devise a plan with street-lines not only more "characteristic," as the Germans say, but better suited to the irregularities of the natural surface. Our American city engineers, whose principle usually is to lay out their streets first with a ruler, and then make the ground conform to them, will probably be shocked to learn that Herr Voss's plan, covering a tract of two hundred and twenty-five acres, has not a straight street or a right angle in it, except where a single highway, already existing, is utilized as a part of the new system. Naturally, the house-lots, the proposed boundaries of which are given on the plan, vary in depth, but the variation is not excessive. Three pretty little parks of indescribable shape are introduced, at nearly equal distances apart. Notwithstanding the irregularity of the ground, the variation in height between different portions being nearly five hundred feet, only one street has so steep a slope as one in twelve, most of them being much less, while the natural surface is very little disturbed. Not only are the streets, as might be supposed, highly "characteristic," but we find that an attempt has been made to lay them out in "soft curves," an expression which, we are sure, is wholly lacking in the vocabulary of American city engineers' offices; and it is interesting to note that the steeper ascents are intentionally curved in plan, "in order to conceal the steepness from the eye."

THE EMPEROR'S SUMMER PALACE.

As an introduction or, rather, as a foil to some account of a visit to Shanghai by Prof. Edward S. Morse which we are about to publish, which account deals with the simpler forms of domestic life and domestic architecture — somewhat after the manner of his "*Japanese Homes*" — we have thought well to introduce here translated extracts from the "*Journal d'un Interprète en Chine*" which appeared at greater length in one of the recent "*Reports*" of the Smithsonian Institution.

The writer, the Comte de Herisson, was not only the interpreter but the private secretary of General Montauban, the commander of the French contingent, and, though a very young officer, shows himself to have been a keen and intelligent observer, adroit in analysis and skilful in synthesis.

The sacking of the summer palace occurred October 8, 1860, and the burning of it was ordered by Lord Elgin on the eighteenth of the same month, after the Europeans had come to full knowledge of the atrocious way in which their diplomatic representatives had been tortured, mutilated and murdered. — EDS.

THE next day the march was resumed at dawn, and the ground became more and more difficult. Finally a long halt was made by the army at a distance of little over a mile from the northeast corner of Pekin. A few minutes later an orderly arrived from General Grant to inform the French Commander that, according to spies, the Tartar army had retired to Yuenmingyuen, the magnificent imperial residence, for the probable purpose of protecting the Emperor, who was thought to be still in this, his autumn palace. Yuenmingyuen is in fact the autumn palace, which all Europeans call — I cannot imagine why — the summer palace. General Grant announced that he was going to visit it, and begged his comrade to accompany him. Montauban, interrupting the conversation held with Lord Elgin, gave the necessary orders, and the march was resumed past Haitien, an unimportant town, where the palace in question is situated, which I, like the rest of the world, shall call, if you please, the summer palace.

The guide who accompanied Grant's orderly told us that the palace was about two miles off; but, these two miles being very much like the "short half hour" of our French peasants, we marched for two hours and did not reach the place. At last, after having made a dozen times the two miles announced by our guide, the French army arrived at Haitien just as the day began to wane.

Just as Versailles is an appendage of the palace of the great king, so Haitien is an annex to the palace of Yuenmingyuen. A broad street, flagged with granite, leads directly to the palace, crossing, 600 feet before reaching it, a monumental bridge thrown over the canal. It is then transformed into an avenue of venerable trees, bordered by houses inhabited by the mandarins of the Court when the Son of Heaven deigns to show himself on earth in his summer palace.

The first companies to arrive halted in front of the palace, and soon the whole army was massed on the grand open square, which served as the court of honor, and which had very nearly the dimensions of the Place d'Armes at Versailles, but with the additional advantage of possessing splendid shade-trees.

Before us rose the hermetically closed walls surrounding the palace, and stretching on either side beyond our vision. . . .

The great gate was opened, the first court was occupied by the Collineau Brigade, and for greater security the gates which opened into the interior of the palace were barricaded without and guarded.

The capture of the palace had cost us the wounds of M. de Pina and M. Vivenot, as well as those of two marines, one sheep, and the general's walking-stick.

The next morning the gates were unfastened and opened. All within was silent and deserted. General de Montauban penetrated into the palace accompanied by Generals Jamin and Collineau and Colonel Schmitz. I had the honor to follow these four officers.

The generals, from a feeling of delicacy, easy to comprehend, had wished that the first visit might be made in the presence of a delegation of English officers, whose troops were marching with us. None of these officers knew what had become of their general-in-chief and the army, and cannon were fired every five minutes for an hour on the great square, to indicate to our allies the place where we could be found.

We five Frenchmen were joined by Brigadier Pattle, Major Sley, of the Queen's Dragoons, and Colonel Fowley, and were preceded by a company of marines.

To depict all the splendors before our astonished eyes, I should need to dissolve specimens of all known precious stones in liquid gold for ink, and to dip into it a diamond pen tipped with the fantasies of an Oriental poet.

What struck me at first was this: Although built in a pure and elegant Chinese style, the summer palace furnished in its arrangement, its architecture, and even in certain of its details, singular reminiscences of the palace at Versailles, modified by the peculiarities of all Chinese constructions, which are never more than one story in height, having only a ground-floor, without attics or mansard windows, with nothing to separate the roof from the rooms on the ground-floor. This distant resemblance is not inexplicable.

The Jesuits, who played so important a part in China, who gave to it veritable Richelieus and Mazarins; the Jesuits, who remained in high honor as semi-sovereigns at Pekin until 1773, when their order was suppressed by Clement XIV; the Jesuits, as clever in administration as they are great in mathematics, who had in their order men having all talents and knowing all sciences, were in some sort the architects of the summer palace and the designers of the beautiful gardens.

At that epoch Louis XIV had sunk so many millions in Versailles that when he received detailed bills he ordered them to be paid and burned, hoping to conceal from posterity as well as from himself his royal folly. The echo of these splendors created by the Grand Monarch reverberated from country to country, transmitted by word of mouth throughout the world, and finally reached the ears of the Emperor of China.

The Son of Heaven found it strange and inappropriate that there should be on the earth a king who took the sacred emblem of the sun and who allowed himself treasures which he, the true Son of Heaven, had not secured. And what sort of a king? A mere kinglet, a man who governed a paltry handful of human beings, 25,000,000 souls, who was consequently only one-thirteenth of his own importance. And in this way, strange as the thing appears, Versailles gave birth, in some measure, on another continent, to the richness and magnificence of Yuenmingyuen. The palace was a long time in construction, and the Jesuits were succeeded by other missionaries, as artistic as themselves, who had but to embellish the original plans. But this is history enough; let us proceed.

At the end of the first court arose on three granite steps an immense hall, its naked walls unornamented save by a few inscriptions, and having no furniture but high-backed wooden benches. It was here that his subjects awaited the honor of approaching His Majesty. Behind the hall on the same level stretches a second court, which separates it from the audience-chamber; this court is furnished with vases of old porcelain, four or five feet high, which serve to hold a quantity of little trees, each queerer than the other. . . . Take, for example, an oak. It is 200 years old; it does not resemble a young tree; on the contrary, it is an exact photographic reduction of a huge and venerable oak of the forest, but it is only three feet high. It is a perfect dwarf, and by the side of it is a group of six trees of different species, growing a few inches apart, in a single vase, which are united at the height of three feet into a single trunk, which branches out a little higher, producing leaves impossible to classify — and, observe, the Chinese are not acquainted with grafting. These tricks are reproduced in all the large pots in varying forms. Generations of learned men have devoted their lives to the study of prócesses for cultivating these vegetable monstrosities, and presently, continuing our visit, we shall find on the shelves of ancient libraries the results of their studies, in well-labelled volumes.

We only gave a passing attention to the extravagant contents of these porcelain vases, of which the smallest would be worth 100,000 francs in Druot's auction-rooms, and we went straight into the first audience-room, which opened before us.

This hall forms one side of a quadrangle of buildings, in the midst of which is a garden and fountains; to the right and to the left are two other halls of audience and of ceremonies, and at the far end of the quadrangle the throne-room.

In the three halls first traversed we found most extraordinary treasures. We must bear in mind that the Emperor preserved in these palaces — transformed into a museum, or, rather, into a warehouse of riches — the most exquisite products of many generations of 400,000,000 human beings, of which he is the demigod, as well as all the tributes paid him by foreign nations, all the presents which fear or admiration had drawn from the great as well as the humble, all which had been confiscated from his rebellious subjects. We must bear in mind that in this immense Empire not a superior work of art was produced which did not naturally drift toward the Emperor, and not a treasure was discovered that did not fall into his hands of its own accord.

Here were gathered all the wealth in precious stones and fine fabrics presented by tributary princes, and all that the kings and emperors of Europe had sent to Hien-Fong and his predecessors, all the bric-à-brac and curiosities, as well as all the goods which the simple-minded merchant, wishing to obtain rights in a port, subtracted from his cargo to propitiate the Sovereign. Everything was preserved with care and equally honored, from a cloth of gold ornamented with pearls, which had come, perhaps, from the Sublime Porte, up to a doll that cried "papa" and "mamma," which a Marseilles captain had taken from his little daughter at Christmas and carried to China to "grease the palm" of the chief mandarin.

This multitude of treasures had overflowed the private apartments of the Sovereign and his wives and spread itself into these immense cathedral halls. The spectacle was at once extraordinary and dazzling — dazzling from the richness of the articles, extraordinary from their number and variety.

At length we reached the throne-room, placed on a platform approached by seven steps of beautiful granite polished like a mirror. It is completely separated from surrounding buildings. Its raised roof, extending at least three feet beyond the granite steps, is supported by two rows of ironwood columns, most artistically engraved and resembles those bamboos or engraved ivories which we in Europe use for tobacco-jars or match-boxes, but swollen to gigantic proportions. No two pillars were alike, and the scenes which were engraved in spirals around their shafts, as on the column in the Place Vendôme, were borrowed in part from national history, in part from legends, in part from celebrated romances and mythology.

The one against which I leaned, the only one of which I have a distinct recollection, pictured the life of the god of wine, whose skull is as high as the rest of his body. He is travelling, peacefully seated upon a buffalo, with a curved stick in his hand, and before reaching

the top of the pillar he must pass precipices, enchanting landscapes and caverns where monsters lie in wait, and finally go under a triumphal arch surrounded by pretty women. It is a lively sort of a journey for the good deity and a symbol of the imaginary voyages which his followers make after too copious libations in his honor.

On the shafts of these columns all the surface of the wood not removed by chisels is covered with lacquer of dazzling colors; on the capitals the imperial dragon twists and rolls himself into all possible shapes, holding in his claws escutcheons covered with mottoes.

From these columns, where our gaze has been agreeably arrested, it ascends to the roof, and there it meets a magnificent spectacle. The roof is covered with those shining yellow tiles made in the little village where we spent last night, the ridges and the eaves being of green tiles as brilliant as the yellow ones, producing an elegant and majestic combination of colors. At the four lower angles of the roof immense dragons of green *faïence* are crouching, inestimable products of the city of Hangtchoufou; the enormous beasts appear to be climbing up the ridges of the roof; they gaze at each other in pairs, their jaws open and their eyes staring.

Finally, at the two ends of the coping a marine monster in green-and-black *faïence* springs at another monster facing him, and gaily raises heavenward a three-metre-long tail, ending in a pinion which serves as a colossal double crest to the whole building, and gives to it a swaggering air, if one can apply such a word to a house.

In the sunlight, whose golden arrows are reflected in blinding array from these brilliant and gaudy surfaces, throwing its sparks into the eyeballs of the monsters, and its shadows into the abysses of their gaping jaws, the superb and magnificent building arises like an enormously magnified jewel.

Everything is clean and clear and intact in this masterpiece, over which the blue sky seems, at the coming of night, to close like a jewel-case with a blue-velvet lining. And the care of its preservation and maintenance is carried so far that wherever a wandering bird might place its tiny feet, it would find an invisible iron wire which would remove his desire to rest there.

The throne-room is entered by a great opening without a door. The interior might be seen from without were the view not intercepted by a screen of teak-wood, as big as the rood-screen of a cathedral — carved, inlaid, cut out like lace, and representing gods, and bounding men and horses — a room 160 yards long, 22 yards wide, and 17 yards high; such are its temple-like dimensions.

The throne faces the screen and is raised upon ten steps; it is a mountain of cushions and silk mattresses, in a niche nearly 25 feet wide, itself cut out of an immense lattice-work wainscoting, like an openwork alcove in the wood of the choir of one of our old cathedrals.

The hall is well lighted throughout, for the windows are close together, and furnished with ventilators, shades and blinds, permitting the passage of refreshing air no matter what the position of the sun. On piers between the windows, frames of sculptured woodwork surround pictured panels.

There is scarcely any furniture; behind the screen is a little altar facing the throne, on the right of the imperial seat a table and an arm-chair of teakwood. On the table are a golden tray, some writing brushes, a saucer of vermilion, and some paper on which is traced characters in vermilion — it is the interrupted correspondence of His Majesty. On the small altar rest two incense-burners of jade, some porcelain saucers, on which, in the absence of the Emperor, are placed fruits, tea and flowers, offerings addressed to his spirit, that, in Chinese belief, is always present in these places.

On either side of the throne, in the corners of the hall, are two doors, each leading to a kind of small saloon or oratory; that on the right communicating with the private apartments of the Sovereign; it is called the *Tien* — heaven.

The walls, the ceilings, the dressing-tables, the chairs, the footstools are all in gold, studded with gems. Rows of small gods in massy gold are carved with such wonderful skill that their artistic value is far beyond their intrinsic worth.

There, on supports of jade, are two pagodas of enamelled gold, as large as corn-bins, with seven superposed roofs, and from each pear-shaped pearls hang like so many bells. In among the gods are European clocks of every description. Two of them are of the beautiful Louis XVI style and are models of good taste, beauty and fine workmanship; alongside are more incense-burners, torches, candlesticks, golden boxes, snuff-boxes embellished with precious stones and enamelled miniatures, a jeweller's fevered dream.

In the other oratory to the left, which resembles the interior of a monstrance, are gathered all the articles for daily use of the "Son of Heaven," when occupying the throne-room; his tea-service, his cups; his pipes — the bowl of gold or silver — the long tubes enriched with coral, jade, rubies, sapphires and little tufts of many-colored silk; his ceremonial chaplets of rows of pearls as large as nuts, which are spread across his august breast, though their whiteness is not quite perfect. Here are his speaking-trumpets of silver-gilt, used at times to swell his voice to thunder tones for the benefit of his prostrate subjects. On wall-cabinets are a great many little silver blades, with rounded ends, nearly half an inch thick, two inches wide and eight long, looking a good deal like our thermometers; these bear engraved characters, the chiselled lines being filled with gold. Etiquette requires you not to speak to the Sovereign, not to even lift your eyes to his sacred person. If, however, he should ask, "What time is it?" how can you reply without speaking or looking at him? With bowed head one of the silver tablets on which is inscribed the particular passing minute is presented to him; he glances at it and learns what he needs to know. It is very ingenious, but for my part I should prefer a good watch.

I shall not attempt to portray the wonder and admiration of the "barbarians" who penetrated into these precincts. Involuntarily we spoke in low tones, and began to walk on tiptoe on seeing before us such a profusion of riches for the possession of which mortals fight and die, and which their owner had abandoned in his flight as indifferently as a citizen closes the door of his house, leaving his mahogany bureau exposed to the chances of war. All was so natural, so familiar, so commonplace to him that he did not even try to save these treasures.

Behind the throne-room, stretched over an immense space, in the midst of gardens, are the private apartments, likewise crowded with objects of luxury and beauty, but on the whole less extraordinary, for between the sleeping-room of an emperor and that of a private person there is less difference than between a throne-room and a parlor.

In the rooms of the Empress, the walls of the closets of the secretaries are furnished from top to bottom with pigeon-holes, in which, one above another, like files of lawyers' briefs, are red boxes of old lacquer of Pekin, wonderfully engraved in *intaglio*, containing ornaments, necklaces, and bracelets in pearls, in jade, in precious stones, tiny rings for feminine fingers, and huge ones of jade, worn by men when they draw the strings of their bows.

Boxes not holding ornaments already mounted are crowded with artistic objects, with materials to be transformed into jewels, with unique specimens of transparent jade, of rock-crystal, of milky jade, of moss-agates, of uncut diamonds, of precious stones still in their natural state; tea-services, cups, saucers, a regular bazaar — not one where everything is quoted at 19 cents — but rather a bazaar where everything is worth 19,000 francs. On opening one of these boxes, it appeared to send out sparks and sheaves of light.

Beyond, great wardrobes of old lacquer set into the walls of the room contain the garments of the Empress, both those for daily use and for ceremonious occasions. There was enough to dress, from head to foot, 10,000 princesses from the "*Arabian Nights*," so that it would be impossible for the Caliph of Bagdad, a judge in such matters, to find occasion for changing the position of a single pin or to alter their arrangement. All is of silk, satin, damask, fur, with embroideries sometimes as delicate as spiders' webs, sometimes as heavy as those on bishops' copes; it is a brilliant display of birds, butterflies, and flowers fresher than those in the sun, with diamond dew-drops in their perfumed calixes.

Here and there footstools of strange shape allow the ladies-in-waiting to reach the high shelves where the toilets are, and offer nest-like cushions to their little crippled feet.

His Imperial Majesty, as every one knows, does not content himself with a single wife. He has concubines, whose quarters are opposite his private apartments. These ladies, into whose rooms we throw a passing glance, our powers of attention being already wearied, are apparently almost as well cared for as their Sovereign, and drink their tea from cups almost as precious as his own. When the Son of Heaven takes a cup of tea here he must perceive no difference.

At last we have finished this endless fairy story and find ourselves face to face with nature, with fountains and with foliage. What a magnificent park! It is immense, with high walls extending about eight and a half miles around it. Those who designed it took special pains to arrange picturesque views, giving impressions which were sometimes gentle and tender, sometimes savage and theatrical; and they succeeded.

But they assisted nature by architectural effects also, and this park of Yuenmingyuen (literally, "residence of the original splendor") contains a little of everything — isolated palaces, temples, pavilions, pagodas, pyramids, porticos, colonnades, artificial mountains, grottos, lakes, rivulets, islands, groves, labyrinths, observatories and kiosks. The artificial rock-work, so fashionable among us a few years ago in Paris gardens, is here — immense, striking, monumental and unique.

Here, for instance, is a mountain built up of rocks; in niches cut in its sides are images of all sorts of infernal divinities, who grin and squirm in the midst of unheard-of vegetation. It dominates the entire park, its summit is crowned by a little pagoda, about 25′ x 20′, surmounted with roofs entirely of white porcelain, decorated with stars; it is dedicated to the Chinese Virgin, Koua Him, who, from this culminating point, seems to extend her protection over all the palaces lying at her feet. She is represented by a statuette of gilded bronze, seated in the midst of a lotus-flower; on each side watches a fully-armed warrior; these two sentinels are engaged in hideous contortions and in making horrible faces.

On the right of this artificial mountain, following a labyrinth whose tortuous paths easily lead one astray in a space of 50 square yards, rises a large building; it is the imperial library. Its roof, with yellow tiles, resembles that of the throne-room, and, like it, is peopled with a menagerie of black *faïence* dragons chasing other chimerical monsters.

The hall, 40 feet high, 30 wide, and 120 long, has its walls lined with cases in which are most curious and ancient manuscripts. In the hall are tables and arm-chairs for studious visitors, and two small altars, one to the north and the other to the south, on which are still slowly burning perfumed incense-sticks in honor of Confucius and of Lao-Tzeu, whose portraits are reproduced on large silken banners suspended here and there.

Here are the grottos, deep, crooked, and full of statues of gods

and animals; some have the entrance curtained by hanging vines; in others a crystal cascade falls from an upper basin and loses itself murmuring through the turf. Here are the lakes; in the centre of the largest is a small palace, which we have neither the time nor courage to visit, but which I beg the reader to keep in mind; he will soon learn why. This palace, built on an island, whose heaped-up soil scarcely rises above the surrounding water, seems to emerge from the bottom of the lake.

On the border of the lake, to the left, is a large building of carved and precious woods, entirely smothered under the vines twining around it, climbing its top, and winding in flowery plumes about the tails of dragons scaling its roof. It is a coach-house, and contains the carriages of gilded and carved wood, with doors covered with Vernis Martin, interiors lined with Genoa velvet, great carriage-lamps of chiselled silver, with thick and heavy cloths like women's dresses at the Court of Louis XIV, and ornamented with pendants of gold and of silk — which had been sent to the Emperor of China by George III, through Lord Macartney at the end of the preceding century. In this memorable embassy, the English, with the object of serving the interests of the East India Company, consented to pay tribute to the Emperor of China. These carriages, their magnificent trappings stretched on wooden horses, were never used; they were covered with dust and could not have been often seen.

Alongside of the stable was the landing-place of the imperial pleasure-boats; its roof of yellow tiles extended above the lake. There was the bark of His Majesty, one for the Empress, others for royal princes, and still others for high mandarins. There was the fishing-boat of the Emperor, gilded and lacquered, and still furnished with his paraphernalia. Within this the Son of Heaven gave himself up to fishing among the innumerable varieties of fish which the Chinese fish breeders, foremost in the world, had created for him, but he cannot have abused this sport, for the fish appeared to us to be quite tame, and as they had no patrotic spirit, they came to the edge of the lake to gaze at the barbarians and shamelessly ate their bread. There are goldfishes a foot long, whose name alone describes them. Here are redfish, cousins to those that people the basins in the Tuileries, and here are little marine monsters, all head, with eyes as large as those of a man; while others resemble the sea-horse, a fish venerated by the Chinese under the name of water-dragon; to us they are hideous, but to them, beautiful.

A little farther on rises a tower, an exact reproduction of the famous porcelain tower of Nankin, its numerous roofs marking as many stories. To reach it one has to pass in front of a pagoda built in honor of Buddha; and the statue of the god seated on a low pedestal, his legs crossed in Turkish or Chinese style, is not less than 65 feet high, while a staircase which runs along the interior wall of the pagoda permits climbing to the level of his head of frizzled hair, his knees being reached at the first story, his navel at the second, and so on. This very ancient statue is of gilded bronze, but time has impaired the gilding; the half-closed eyes of the god are of silver, their pupils of iron; from one knee to the other at the base the statue measures 45 feet. Two gigantic incense-burners and one altar are in this pagoda, which has been constructed solely as a shelter to the statue.

Our presentation to this enormous gentleman terminated our visit to the summer palace. It had lasted several hours. We returned worn-out, exhausted, our eyes burning from the sight of all this gold and this splendor, with aching heads.

The general-in-chief placed sentinels at all the entrances to prevent any one from penetrating the palace before the arrival of our allies, and he assigned two captains of artillery, MM. Schelcher and de Brives, to see that the order was strictly carried out.

To add to the effect of our signal guns, Brigadier Pattle had sent numerous troops of cavalry in every direction, who finally met General Grant with his army and brought them in at noon. On his arrival General Grant went into the palace and saw with his own eyes that everything was intact.

PARIS

GREAT UNDERTAKINGS BY THE MUNICIPALITY. — PROPOSED NEW BRIDGE OVER THE SEINE. — THE EQUITABLE INSURANCE BUILDING. — THE THIÉRY BEQUEST TO THE LOUVRE.

WHAT will Paris look like in fifty years — even, perhaps, before that? It will be larger surely, possibly it will be uglier. In any event, if the projects already voted by the Municipal Council are carried out, it will have lost the little that is left of its picturesque and historical beauty. Under the Second Empire, Haussmann, the Prefect of the Seine, drew up a plan for the embellishment of the city, which, it must be allowed, was intended to do away with certain old quarters that really encumbered the centre of Paris. It is to him that we owe the widening of the present streets, the cutting of the Avenue de l'Opéra, the boulevards on the left bank, and the creation of all the wide and well-ventilated streets upon which handsome and hygienic modern buildings have replaced the old and unhealthy structures. These are changes which hardly any one dares to regret. This necessary disembowelling perforce drew after it the disappearance of certain picturesque corners and provoked certain regrets on the part of artists smitten with the love of old things and the admirers of old Paris. But there still was left the Marais, the Ile St. Louis and the Ile de la Cité, where certain relics worthy of their love and adoration were still to be found.

Alas! The Municipal Council has just dealt them a cruel blow. Not content with its recent decrees taxing land not already built on, thus, consequently, assailing private gardens and provoking the destruction of the little that is left of verdure and freshness in Paris, it has just voted in favor of certain works which, if carried out, menace one of the classic beauties of the capital. This tax on land not built upon, of which the *American Architect* spoke in its issue for the 30th of November last, may be, and probably will be, annulled, but the misfortune would be irreparable if a sequel should be had to the vote passed by the Municipal Council in the last month of the past year.

Among the works proposed for Paris, there are some of great utility. The demolition of the fortifications, for example, is an absolute necessity. Now no longer answering to the real needs of defense in case of war, they render unfruitful a considerable superficial area of land the sale of which would create for the city enormous revenues. So the suppression of the fortifications on the west and northwest of the city is a burning question just now. That is to say, on the side where the population seems most inclined to spread. The city would equally find serious advantages in the sale of a large part of the Champ-de-Mars. One scheme, a very ingenious one by M. Bouvard, architect of the Services of Architecture, consists in at length demolishing the Gallery of Machinery, and creating a long and wide avenue, bordered by gardens, on the axis of the Champ-de-Mars in front of the École Militaire. The land bordering on each side of this avenue would be sold under the pledge of having built there magnificent buildings.

These schemes are very attractive; so, too, is the completion of the Boulevard Haussmann, for a long time demanded, and also that of the Boulevard Raspail, on the left bank. Unfortunately, they don't stop here, and there is now a question of the prolongation of the Rue de Rennes, under conditions which are absolutely disastrous.

This prolongation of the Rue de Rennes carries with it, in fact, the demolition of a portion of the Palace of the Institute, and, what is still more unfortunate, the building of a bridge over the Seine, the central pier of which would have to rest on the extreme point of the Ile de la Cité. This scheme, in fact, was an item in Haussmann's plans, in so far as concerns the demolition of the Palace of the Institute. Without the least compunction, this vandal prefect had the intention of sacrificing both wings of the Palace; but the Commission Supérieure des Bâtiments laid a protest before the Emperor. In 1860, the latter visited the Bibliothèque Mazarine, and, thanks to M. de Sacy, the threats of M. Haussmann were not carried out and the Institute was saved. To-day, the administration of the city again takes up the scheme. They modify it and ameliorate it in the sense that the entire façade of the Palace is to be respected. The buildings on the grand courtyard in the rear will alone be sacrificed, in such a way as to allow a new street to be cut between the Palace of the Institute and the Hôtel de la Monnaie. But what is to become of all the services of the Institute now arranged in a retiring and quiet fashion, far from the noises of the street, in such a way as to assure the calm and retirement necessary to our savants and our artists? The library and halls of study will have to be rearranged and brought out upon the façade on the new street, with its animation and noises. Hence, protestations have not tarried, and the Academicians are ready to defend their home.

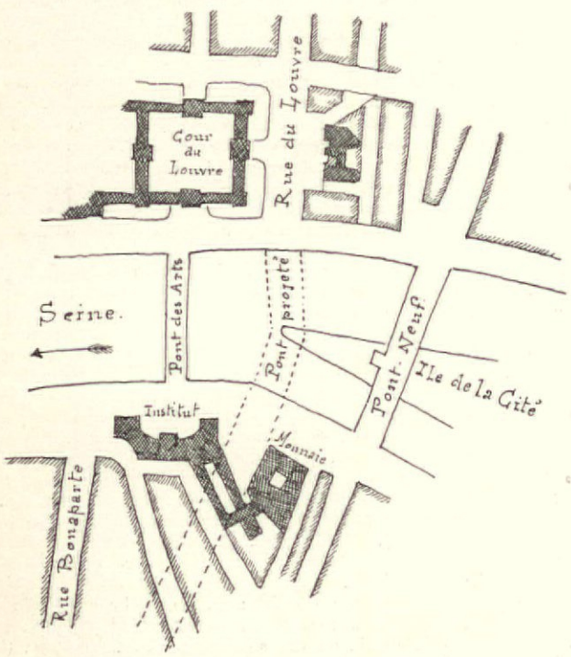
If this careless disregard of the rights of the Institute is blamable, what shall be said of the construction of a new bridge, which is one of its consequences?

In the eighteenth century, a distinguished traveller professed that the three finest views that he had ever encountered in his long journeyings were that at the entrance of the harbor of Constantinople, that from the port of Goa, in the Portuguese Indies, and, finally, that from the Pont Neuf, at Paris. There is little literature and few artists who have not paid their tribute to this vision of old Paris, — Notre-Dame, the Sainte Chapelle and the Palace of Justice, silhouetting their *flèches* and towers above the verdant point of the Ile de la Cité and the majestic arches of the Pont Neuf. In the transparent mists of the morning, in the warm caress of the setting sun, it is always a superb picture and one of the picturesque scenes most admired by strangers.

Can one imagine this panorama cut athwart by a modern bridge? Can one suppose this admirable perspective of *quais* and the banks of the Seine barred forever? This little verdant island suppressed and replaced by monumental and heavy piers? Do not allow the example of the Alexander III Bridge to be invoked, which also was criticised before its execution. Let no one bring forward reasons of sheer utility.

The site of the Alexander III Bridge cannot be compared with this of the projected bridge, which must be placed at the very spot where the Seine is widest and most beautiful. As to utility, that is a matter open to discussion. The end aimed at is the facilitated communication at this point between the left and right banks in the line of the prolongation of the Rue du Louvre. But even though this end cannot be attained save by means of such sacrifices, is it not

allowable to demand of practical exigencies certain concessions in favor of art and the æsthetic beauties of the city? A bridge is necessary? Well, nothing is easier than to build one in place of the Pont des Arts, a simple foot-bridge now, impassable to vehicles. On the axis of the Palace of the Institute and the arcades of the court-yard of the Louvre, this bridge, with its sufficient widenings at each end, and the widening which would be necessary in its length, would



Plan indiquant le tracé du nouveau pont projeté.

only compel an insignificant detour for one desiring to enter the Rue du Louvre.

As to the prolongation of the Rue de Rennes, it could be made much more economically by a widening of the Rue Buonaparte, which would allow the integrity of the Palace of the Institute to be absolutely respected.

How simple this is! It is much too simple to be approved by the Administration. But, nevertheless, the scheme voted by the Municipal Council, and which, happily, must be discussed in the Chamber of Deputies, has made a great number of people indignant. In the Municipal Council itself, several have protested; several journals voice cries of alarm and call upon the societies of artists and upon the commissions charged with defending the monuments of the past. Let us hope that these efforts will result in something and succeed in fending off an act of real vandalism. And, in this connection, is it not regrettable that the societies which are now called upon to protest against this scheme should not, in the first place, be consulted, before votes of this importance are carried? It would be interesting to have, before reaching decisions of this character, the advice of competent artists and architects. This is done in Vienna, and, I believe, in certain other cities of Europe. It would evidently be necessary that a special commission should be composed of persons very independent, while having incontestable authority. It is this attribute of independence which is too often lacking. So, in the matter which occupies our attention to-day, the Société Centrale des Architectes was invited by some of its active members to publicly protest before the administrative powers against the construction of the projected bridge and the partial demolition of the Institute. Surely, the proposition would have rallied numerous suffrages when it was perceived (Oh, irony!) that the president of the said Society was the very one entrusted, as architect of the Institute, with the study of the project! He could not, then, protest, even in the name of his confrères, against the very work which he was charged with carrying out! But, isn't it amusing?

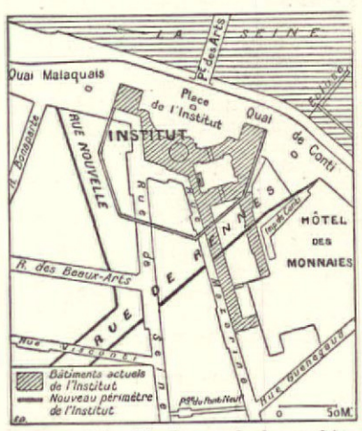
Amongst the other schemes interesting the capital and its monumental wealth is one which, in a private capacity and aside from all matters of public administration, is not less important. This comes to us from the United States in the way of a grand insurance building — the Equitable. For several years past we have had on the boulevards a very rich and sumptuous building, erected by the New York Life Insurance Company.

The Equitable of the United States, already the proprietor of two buildings on the Avenue de l'Opéra, has just acquired the corner of the Place de l'Opéra included between the Rue de la Paix and the Boulevard des Capucines. The buildings now standing occupy an area of 1,197 metres, and their façades, developed, measure 99.5 metres, of which 53.5 are on the Boulevard, 19 on the Place de l'Opéra and 27 on the Rue de la Paix. The price paid by the Equitable is 8,000,000 francs. It is, therefore, a very important affair, all the larger since it is the intention of the Company to demolish the present buildings and build in their place new ones for the composition of which a competition is to be opened to all French architects. This was what was done with the New York building. If the results of the new competition are as satisfactory, we shall have, on the Place de l'Opéra, a new palace of splendid elegance adding to the richness of this place a unique framing such as our Grand Opéra deserves.

If things go on in this way, it is America, apparently, which is going to rebuild Paris!

While all these schemes are being elaborated with a view to its architectural transformation, Paris finds the collections at the Louvre enriched by a princely gift. A Moor, of French origin, M. Thomy Thiéry,[1] has just died, bequeathing to our National Museum a collection whose richness is beyond words. Never, since the time of the Lacaze bequest, which fills an entire hall at the Louvre, has a more princely gift been offered. It includes, in fact, a marvellous collection of our French masters of the nineteenth century, of almost the entire work of the sculptor Barye, in models, and a superb collection of furniture in Gobelin tapestry, all estimated at a value of 9,000,000 francs. The cause of the formation of this collection is sufficiently odd. Very much smitten with the school of painting which stretches from 1825 to about 1860, Thiéry adopted the programme of having in his collection twelve paintings by each of twelve artists. His choice rested on Delacroix, Decamps, Millet, Théodore Rousseau, Corot, Tryon, Isabey, Jules Dupré, Diaz, Daubigny and Meissonnier. As the twelfth master, the collector fixed upon the sculptor Barye. But time was too short for him to be able to completely carry out his programme, and his collection is composed of 12 Corots, Jules Duprés and Diazes, 13 Daubignys, 17 Decamps, 11 Delacroix and Tryons, 6 Théodore Rousseaus, 6 Isabeys, 6 Millets and 5 Meissonniers. Barye, unfortunately, is represented only by a single finished piece — "The Two Lions." In all, then, there are 115 canvases and 1 piece of sculpture. It is not a bad legacy! When we shall actually come into possession of these *chefs d'oeuvre* is unknown. Perhaps not immediately, as administrative formalities in France take time!

We find from an account in *L'Eclair* that the question of throwing a new bridge across the Seine has apparently been settled in the negative, largely through the intervention of the Commission du Vieux Paris and because of the general feeling that it was necessary to preserve the historic view from the Pont Neuf and the refreshing bit of verdure to which our correspondent refers above. The Prefect of the Seine, however, gave the matter a turn of great significance, for he declared that the Commission du Vieux Paris was not merely the zealous guardian of the treasures of past ages, that it had not merely the narrow function of jealously watching over the riches of the past, but that it had a more vital mission in a higher and larger degree. Its real duty was to associate itself with the incessant transformations going on in a great city where the appearances of things are inevitably submitted to unceasing progress. The Paris of the Commission du Vieux Paris is not a thing which cannot be varied from. The necessities of the city's active life lay on it the obligation of constantly rebuilding upon its own ruins. The ideal effort, therefore, is to reconcile the feverishness of contemporaneous demands with the serene calmness of the dead centuries. The way to really defend Old Paris is to allow her to lend herself, in the happiest way possible and without damage, to the decoration of the New Paris. The prefect, therefore, promised to always submit all questions to the consideration of the Commission du Vieux Paris whenever the embellishment of New Paris was under discussion.



The question of the new bridge being thus disposed of, the changes of the street-lines, in so far as they affect the Palace of the Institute, suggested by M. Bouvard, the architect in charge of the building, appear to have been adopted, as shown in the annexed plan, and M. Bouvard declared plainly that he created these two streets in order that the erection of a new bridge might be avoided. The

[1] The Paris *Figaro* gives some interesting details concerning M. Thomy Thiéry, whose gift of modern pictures, worth millions of francs to the Louvre, has been recorded above. He was born in 1823, at Port Louis, in Mauritius, and educated in Paris. He went back to Mauritius in 1848 and continued to work the sugar plantations left him by his father until 1875, when he settled in Paris. His hobby was picture buying, especially pictures of the school of Corot, Dupré, Millet and Daubigny. According to common report he spent about $800,000 upon his collection. He was represented at every important picture sale of the last thirty years, whether in France, England or this country. During the last ten years of his life he was afflicted with partial paralysis, which confined him to a chair and finally to a species of litter which was moved from place to place in his gallery, so that he could always have some of his masterpieces before him. The sole condition of his gift to the Louvre is that the collection shall be kept together in a gallery to be known by his name.

circulation in this way will be divided into two streams, one flowing towards the Pont Neuf and the other towards the Pont des Sts. Pères. The possibility of getting along without the new bridge is further strengthened by the fact that the Metropolitan Railway is to pass under the river, in that way connecting both banks. This solution has received the approval of the Commission du Vieux Paris and this approval is to be considered as its contribution to the decoration of New Paris. But, at the same time, in order that there may be no misapprehension as to its convictions, it has renewed its aspiration that no bridge should be thrown across the Seine between the Pont Neuf and the Pont des Arts, and this is its contribution to the preservation of Old Paris. As for the Palace of the Institute, the façade towards the river remains unchanged, and by the new disposition of the streets it secures a larger area of ground than that which it abandons to the new thoroughfares. — EDS.

THE LATEST FROM THE ROMAN FORUM.[1]

IT is as nearly as possible three years since the era of new discovery in the Roman Forum was opened by Signor Giacomo Boni. Every year has brought fresh results, and though, as time goes on, the area which still offers possibilities for enlightened excavation is becoming more restricted, there is no reason to suppose that the era is nearing its close. Still, the character of the work is gradually changing.

Startling discoveries like those of the Lapis Niger, the Fons Juturnæ and the Basilica Palatina (Santa Maria Antiqua) are no longer within the bounds of probability, but an immense field for patient investigation lies open in the nooks and corners of the Forum and in the apparently meaningless spots which lie between the sites of the chief monuments. Ritual pits, deposits of sacrificial ashes, old drains and shapeless blocks of concrete become under Signor Boni's patient and thorough analysis so many leaves in the Book of the Forum which the world is entitled to expect him to write. This kind of work is more tiresome to onlookers than the excavation of famous spots, but it is equally useful because it helps to confirm old impressions, to correct assumptions which previously seemed justified, and to pile up a mass of evidence from which archæologists will be able to draw sound conclusions.

The most picturesque discovery of the year, or rather the one which appeals most strongly to the imagination, is that of the subterranean galleries running north and south and east and west under the heart of the Forum, in the space between the Black Stone and the Basilica Giulia, immediately in front of the Rostra. These galleries are 10 feet high and 4 feet broad. They lie about one foot below the surface of the Forum, and communicate with the air by openings large enough to admit of the passage of a man. At distances along the galleries there are square chambers large enough to admit apparatus for working a kind of windlass, and the sides of the openings are worn down by rope-marks — a sign that heavy objects must have been raised and lowered through them. Some of the elm beams which served as windlasses were found in the galleries. The most probable explanation is that the galleries were used as an armamentarium during the Cæsarean games which took place in the Forum prior to the construction of the amphitheatre. The most probable date of their construction is about 45 B. C., during the lifetime of Julius Cæsar; and the Aretine vases, the coins and other datable objects found in the galleries show that they must have been abandoned during the reign of Augustus.

For the present the examination of the galleries has had to be suspended owing to the infiltration of water, but as soon as the municipality has arranged a proper outlet for the Cloaca Maxima, operations will be resumed. It is easy to imagine the bustle which must have gone on in these galleries during the Cæsarean games when scene-shifting and stage-carpentering had to be done or when banquets had to be served. The galleries could certainly contain several scores of workmen at a time.

Another important discovery of the year is the Volcanale, or original rock, cut perpendicularly so as to form a kind of rostrum near the Senate House before the regular Rostra were constructed. The rock still bears traces of the red plaster with which it was covered in the time of the kings. This discovery has completed the series of Rostra which represented the tribunals of the common people. Of the curious arched chambers under the Imperial Rostra descriptions have previously been given, and Signor Boni's hypothesis that they served as a repository for the bronze rams or rostra of the enemies' captured ships is still the only credible explanation of their purpose.

In other parts of the Forum, excavations have led to the discovery of the site of the Temple of Jupiter Stator, near the Arch of Titus, and to the unearthing of the bases of the arch itself so that its original proportions may be seen and its history imagined from the different levels of the marks made by wheels as they rubbed against its sides. At the same time work has been pushed forward behind the Church of Santa Francesca Romana, where the graceful arcades erected in the fifteenth century on the foundations of the Temple of Venus and Rome have been rendered visible. The old cloisters and rooms of the convent are being converted into a museum for the principal objects found during the Forum excavations.

Much careful reconstruction has been done in the Palatine Basilica, commonly known as Santa Maria Antiqua. As inevitably happens whenever buried frescos are brought to light, their freshness gradually disappears, and it becomes impossible to form an idea of their original beauty unless they are carefully damped with a wet cloth or brush. As this process, if open repeated, would naturally damage the frescos, Signor Boni has had them carefully copied by special artists, who have succeeded in reproducing the frescos with perfect color and accuracy. These copies will be placed in the new Forum Museum at Santa Francesca Romana, where they will be accessible to all visitors. Signor Boni is also bridging over the gap which now exists in the winding tiled slope that leads from the side of the Palatine Basilica up to the Palatine Hill. This operation is one of great delicacy, but when completed it will enable the true relation of the Palatine to the Forum to be understood, especially after the Vicus Tuscus had been thoroughly cleared of earth and the Temple of Castor and Pollux completely isolated. It will then be possible to clear the whole of the foot of the Palatine Hill and to pass along it, by the baptistery of San Theodorus and the Byzantine Church of San't Anastasia, to the Circus Maximus.

In comparison with undertakings of such importance the discovery of the splendid mosaic pavements of the House of the Vestals and of other details of the ritual and sacerdotal edifices of the Romans seem almost insignificant, but they prove the theories of some earlier excavators concerning the asceticism of the life and dwellings of the Vestals to be far from the truth.

Until Signor Boni has completed the series of reports to the Government which he is now writing it will not be possible for others than professional archæologists to form a connected idea of the light thrown by his discoveries on the life of the Forum as a whole and its place in the organization of the Roman State. In the meantime the Italian Government may be congratulated on possessing so intelligent and indefatigable an official and on having seconded his efforts to elucidate one of the most interesting problems of human history.

[1] Correspondence of the *London Post*.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

BOULEVARD ENTRANCE TO GORDEN PARK, CLEVELAND, O. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

THE HATCH LIBRARY, ADELBERT COLLEGE, CLEVELAND, O. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

DETAILS OF THE DE LA MONTAGNA MAUSOLEUM, CYPRESS LAWN CEMETERY, SAN FRANCISCO, CAL. MR. B. J. S. CAHILL, ARCHITECT, SAN FRANCISCO, CAL.

ST. PAUL'S CHURCH, NANTUCKET, MASS. MR. JOSEPH W. NORTHROP, ARCHITECT, BRIDGEPORT, CONN.

THIS church is being built by Miss C. L. W. French, of Boston, as a memorial of Mr. Jonathan French, one of Boston's old time merchants. The material is light buff-gray granite. The roof is of black slate. The west window, also five chancel windows, are by Tiffany, and are memorials of relatives of Miss French. The interior is finished in ash and oak. There are columns of wood, with richly carved capitals between nave and aisles. The cost is about $35,000.

[The following named illustration may be found by reference to our advertising pages.]

SECOND-PRIZE DESIGN FOR CITY-HALL, RIGA, RUSSIA. MESSRS. WALTER & HEGER, ARCHITECTS.

THIS plate is copied from *Architektonische Rundschau*.

[Additional illustrations in the International Edition.]

THE PONT ALEXANDRE III, PARIS, FRANCE: TWO VIEWS.

THE PONT DES ARTS AND THE PALAIS DE L'INSTITUT, PARIS, FRANCE. M. LOUIS LEVAU, ARCHITECT; — THE PONT NEUF, STATUE OF HENRI IV AND THE PANTHÉON, PARIS, FRANCE.

THESE views are interesting in connection with the suggestion concerning a proposed new bridge over the Seine, which our Paris correspondent discusses elsewhere in this issue.

THE PONT DE GARABIT, CANTAL, FRANCE: TWO VIEWS.

THE PONT DE L'ALMA, PARIS, FRANCE, AND BUILDINGS OF THE PARIS EXPOSITION OF 1900; — THE PONT AU CHANGE AND THE CONCIERGERIE, PARIS, FRANCE.

PUBLIC SCHOOL NO. 166, NEW YORK, N. Y. MR. C. B. J. SNYDER, ARCHITECT, NEW YORK, N. Y.

ENTRANCE TO THE SAME.

NOTES & CLIPPINGS

TUNNELLING A VENETIAN CANAL. — The Italian Government has decided to construct a tunnel connecting Venice with the adjoining island of La Giudecca. — *Exchange.*

THE CLEVELAND, O., GROUP PLAN. — Further steps have been taken in the last few days in the advancement of Cleveland's scheme to reconstruct the public buildings of the city on the "group plan." A site has been chosen for the execution of the scheme, and friction between the city and county authorities, which threatened the success of the project at one time, has been overcome. As now decided, the municipal, county, and Federal buildings will be grouped about a court of honor, some 350 feet wide, and long enough to stretch from Superior Street north to Summit Street on the lake-front, a distance of five blocks. Altogether, something over eight squares of the city will be given over to this scheme of architectural embellishment on a grand scale, in addition to the land on which the Federal Building will stand and the abutting square already used as a park. In other words, practically ten city blocks will be devoted to the buildings of the group and the parks and courts within and about it. On the south, it is proposed to give the place of honor to the new Federal Building; on the north, next the lake, where the new park to be created will be but a street's width removed from the Lake View Park, which stretches along the water-front, space has been allotted for a court-house, in deference to the desires of the County Commissioners that their building be in as conspicuous a position as possible. Along the sides of the court of honor thus bounded at its ends there will be a library, music-hall, City-hall, separate buildings for the Chamber of Commerce and Board of Education, and also, it is hoped, a gallery of art. Expropriation will be the necessary method for obtaining much of the needed land, and legislative authority is required before actual work can begin. The improvements will cost complete, it is supposed, about $16,000,000, but the work will be carried out so gradually that this expenditure will be spread over a number of years. Part of the necessary land is already owned by the city, as the central boulevard or court will be where Wood Street now is, and to some extent park-lands will be used. Not without reason, the people of Cleveland are inclined to expect great results from this Hausmannizing of the principal portion of their town. Carefully carried out, the plan offers great possibilities of civic and artistic distinction. Too many cities, especially in their central sections, have been allowed to grow up in haphazard fashion; too few have ever risen on the lines of a preconceived and judicious plan. While lacking the eyesores which make parts of the national capital hideous, Cleveland promises to develop beauties which in many respects may rival even those of a reconstructed Washington. — *N. Y. Evening Post.*

STOOP PROJECTING BEYOND THE STOOP-LINE. — George H. B. Hill, the owner of the premises 25 West Thirty-fourth Street, on May 19, 1898, sold the property to Mitchell A. C. Levy. The latter paid $1,500 on account, and the searching of the title cost him $240. As a result of the search Levy discovered that the stoop of the Thirty-fourth Street building extended beyond the stoop-line 15 feet 8 inches, and constituted an unlawful encroachment upon the street, and was liable to be removed at any time by the municipal authorities. Levy held that the extension made the title defective, and brought an action asking that a just deduction be made from the purchase-money because of the defective title and the incumbrance and encroachment mentioned. The Court held that this suit could not be maintained, and then Levy sued to recover the deposit-money and the cost of searching the title. This also fell through, Justice Patterson in his opinion saying: "The projection of a stoop beyond the line of a city street is not necessarily unlawful, and the question as to whether it is can only arise between the municipal authorities and the owner of the building, and that such encroachment does not constitute a defect in the title. The stoop in the present case has occupied its present position for thirty years and upward without objection on the part of the municipality or of adjoining property-owners or any other persons. The contingency that its removal will ever be compelled by the municipality or any person having authority in the premises is so remote as not to be within reasonable contemplation. These decisions are authoritative of the questions presented and result in the conclusion that plaintiff is not entitled to recover the sum sought to be recovered in this action." On a motion for a new trial upon exceptions the case came up before the Appellate Division of the Supreme Court, and Justice Hatch, in his opinion, concurred in by Justices O'Brien, McLaughlin, and Laughlin, filed recently, granted a motion for a new trial. To this finding Justice Van Brunt dissented. — *N. Y. Times.*

JOHN RUSKIN AND NEWMAN HALL. — While his church was building, Mr. Newman Hall had an amusing bout with Mr. John Ruskin. He went and asked the seer's advice as to how to erect a church which should not only be commodious, but beautiful, not only sheltering from rain and sun, but inspiring happy thoughts and holy emotions. He replied — as he had already written — "that we should not build up stones, but gather together a few people who would not steal or tell lies." "I said," writes the pastor, "that we had many hundreds of such, and needed a building where under shelter they might worship and be taught. He repeated his opinion, and I said I had made a mistake in troubling him, as I thought I was speaking to the author of the 'Stones of Venice.'" Whereupon Mr. Ruskin made the singular reply: "No, you are not. Every one who does something in teaching men passes through three stages of life. At first he teaches what is inaccurate; then he unlearns it, and lastly he teaches the Truth — which stage I have now reached." That was in 1872. — *London Chronicle.*

PROPOSED STATUE OF L'ENFANT. — Representative McDermott of New Jersey has introduced a bill in the House appropriating $50,000 for the erection of a statue in the city of Washington in memory of Major Pierre L'Enfant, who prepared the plans of that city. — *Exchange.*

THE WALLS OF AVIGNON. — The Paris correspondent of *The Times* says Edouard Aynard attacked the Government in the Chamber of Deputies recently, in the course of the debate on the Fine-Arts Estimates, for allowing the municipality of Avignon to demolish a section of the ramparts. M. Aynard also condemned the Commission on Historical Monuments for allowing the demolition. The portion of the ramparts demolished consists of about 1,200 feet of wall opposite the railway-station. It is not ancient, having been rebuilt by Viollet-le-Duc. The really historical parts of the walls of the old City of the Popes will not be touched, says *The Times's* correspondent, and it is unlikely that visitors will discover any change in the appearance of the city.

PORTRAIT-BUSTS OF MEMBERS OF THE INSTITUTE OF FRANCE. — It has been customary for the Institute of France to order a bust of each deceased member placed in the hall of the Institute. Recent criticism has led to a proposal to have such busts made when members are elected instead of waiting until their death. Very often the sculptor intrusted with such a commission never saw the savant whom he had to immortalize; and so having nothing but descriptions and, possibly, a few photographs to work from, he produced a bust that had but slight resemblance to the personage whose name it bore. French critics have also pointed out that the men elected to the Academy take their seats at the very time of life when their fame is at its height, and that this is the period when they should be represented, and not at the close of life. It is pointed out that should the modesty of the "immortals" object to the new order of things, their busts can be made when they are elected, but not put in place until after their death. — *Exchange.*

UTILIZING RUBBER SCRAP. — "The utilization of rubber scrap," says the *Electrical Review*, "is of very great importance, for anything that can be added to new rubber to decrease its cost and increase supplies must be welcome, providing that the compound is serviceable. The scraps are sorted according to their composition, and then cleaned by boiling, which removes dirt, absorbed any adhering acids, and free sulphur; but attempts to desulphurize vulcanized rubber have not been successful yet. The waste is ground between rollers and reduced to powder in emery-grinders with automatic feeding, and in many cases the resultant material can be added at once to the new rubber mixture; but generally it is treated chemically by being boiled in a caustic-soda solution or sulphuric or hydrochloric acid, and then steaming for about twenty-four hours at a pressure of four atmospheres. In another method, the ground scraps are steamed with soda-lye under pressure, thoroughly washed twice to remove the lye, and then dried in vacuum. Then they are mixed between cold rollers with from 5 to 10 per cent of benzol or mineral oil and steamed for several hours, at the same pressure as above. After either of these processes, the product is rolled into plates and then added to the rubber dough."

THE FLORENTINE DUOMO AND THE VERSAILLES PALACE. — The decree of the Florentine Republic, which in the thirteenth century ordered the construction of Santa Maria del Fiore, could not be surpassed by any edict of ancient Rome. It says: "Whereas the chief aim of a people of great origin being to act in a way that, from its outward works, every one should recognize both its wise and magnanimous manner of proceeding, we order Arnolfo, chief architect of our city, to make a model or design for the complete rebuilding of Santa Reparata with the greatest possible magnificence that the human mind is capable of conceiving, since it has been decreed in council, both public and private, by the most able men of this city, that nothing should be undertaken for the community which did not correspond entirely to the ideas of its most enlightened citizens united together to decide on such subjects." Contrast this with the pride and fear of Louis XIV — fear of living in view of the sepulchre of his race — which led to the erection of the Palace of Versailles, and we have the direct measure of the difference between the nobility of a religious people, whose imaginations are exalted by art, and the meanness of a ruler who makes art the mere instrument of his self-glory. The relative magnanimity of the two is nowhere more strongly shown than in the disregard of expense actuating each. The king forced a powerful and wealthy nation to the brink of ruin to gratify his selfishness, for the palace has been said to have cost from twelve to forty millions sterling; the republic of Florence contributed their money to erect religious edifices with a proud alacrity which would astonish modern economists. In 1334 they commenced building the present campanile, passing a decree that it should be built so as to exceed in magnificence, height and excellence of workmanship whatever in that kind had been achieved by the Greeks and Romans in the time of their utmost power and greatness. The first stone was laid accordingly with great pomp on July 18 following, and the work prosecuted with vigor and with such costliness and utter disregard of expense that a citizen of Verona, looking on, exclaimed that the republic was taxing her strength too far, that the united resources of two great monarchs would be insufficent to complete it — a criticism which the Signoria resented by confining him for two months in prison, and afterwards conducting him through the public treasury, to teach him that the Florentines could build their whole city of marble, and not one poor steeple only, were they so inclined. This "one poor steeple" is the most beautiful specimen of tower architecture the world has to show, costing at the rate of about sixty pounds per superficial foot, making an entire expenditure of five millions old currency, which, by taking the present value of wheat and comparing it with the price of the fourteenth century, would augment its cost fivefold. — *The Architect.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, APRIL 5, 1902 No. 1371

CONTENTS

SUMMARY: —
The Form of this Week's Issue in the International Edition. — Legislating for the Ventilation of New York School-houses. — The Reforestation Movement in New Hampshire. — The Great Stairway at Copan, Honduras. — Accidents caused by the Splitting of Stone through the Rusting of inserted Iron. 1
NOTES ON IRON AND STEEL CONSTRUCTION. — VI. 3
LA HUNAUDAYE, BRITTANY. 6
ILLUSTRATIONS: —
Tentative Sketches for "Wheatleigh": House of H. H. Cook, Esq., Lenox, Mass. — Preliminary Study for the Same. — Terra-cotta Details from the Same. — Statue of "Helvetia" in the Entrance-hall of the Union Bank Building, Zurich, Switzerland.
The Château de Clambeau, Nièvre, France.
Additional: "Wheatleigh": House of H. H. Cook, Esq., Lenox, Mass.: —The Entrance-front; Main Entrance; A Gate-post; Rear Entrance-arcade; Side View; Lawn Front; Garden Front. — Harvard Union, H. U., Cambridge, Mass.: — The rear View; East End of Living-room; West End of Living-room. — Details of Interior Treatment of the House of Colonel Guffey, Pittsburgh, Pa.: Six Plates. — House of Giraud Foster, Esq., Lenox, Mass.: — The South Front; The Vestibule; The Main Hall; Mantlepiece in the Main Hall; The Main Staircase; The Palm-house; The Palm-house Entrance; The Dining-room; The Den; The Living-room; A Fireplace in the Living-room; A Corner in the Parlor; Fireplace End of the Parlor. — The Field Memorial Library, Conway, Mass.: — The Main Front; Entrance Portico; The Delivery-room. — "Elm Court": House of W. D. Sloane, Esq., Lenox, Mass. — The Lawn Front; The New Front; The Entrance Front; Side Entrance. — Statues from the Maximilian Tomb, Innspruck, Tyrol, Austria: Four Plates. — Statues from the Maximilian Tomb, Innspruck: Seven Plates. — A Monument to the Memory of M. Edouard Remy, Louvain, Belgium. — Views at the Pan-American Exposition, Buffalo, N. Y.: — The Electric Tower; "Gen. W. T. Sherman": Model of Equestrian Statue for New York, N. Y.; "The Challenge"; The Triumphal Causeway: The "Fountain of Man"; The "Fountain of Nature"; The "Struggle for Existence": a Fountain; Termes and Electric Candelabra in the Sunken Garden; A Pavilion of the Manufactures Building; Terrace of the Propylæa; "The Chariot Race"; Base of the "Fountain of Nature." — Doorways at Beauvais and Provins, France. — Transept Door, Cathedral of Coutances, Manche, France, — Church Doorways, Le-Mesnil-St.-Denis, France. — Church at Berzy-le-Sec, near Soissons; — Church at Braine, France. — Church at Frouville, France; — Abbaye de la Luzerne, St. Pierre-Langers, Manche, France. — Church at Vailly, Aisne, France; — Church at Vasseny, near Soissons, France. — Candelabra, 149 Broadway and 20 Broad St., New York, N. Y. — "The Medicine Man," Paris Exposition of 1900; — Colonnade of the Louvre and Fremiet's Statue of "Velasquez," Paris, France. — The Fountain of St. Sulpice, Paris, France; — The Chapel of the Sorbonne, Paris, France. 6
NOTES AND CLIPPINGS. 8

SUBSCRIBERS to the International Edition will receive with this week's issue the full quota of "additional" illustrations that, under our former system of publication, would be sent them distributed between this and the next twelve issues of the *American Architect*; thereafter and until the first issue for July the mail will bring them each week, in place of the familiar blue-covered International copy, the straw-colored copy of the Regular Edition with its quota of text and illustrations. So on July first they will find they have received the exact amount of text and illustrations that belong to a quarterly volume, but that it has reached them in an unusual combination and order. The change now made is an experimental one and can be continued or abandoned according as the subscribers express to us their approval or disapproval of it. For our own part, we are not in a position to know whether the change is likely to be a relief or an added burden; this number has certainly been burdensome, since we have had to prepare and manufacture in thirteen weeks the amount of illustrative material that hitherto has been evenly distributed over twenty-six weeks. But as the object of the change is not to procure relief for ourselves, but to render better service to our subscribers, we give to our own opinions and feelings a quite secondary place in the consideration of the problem. The illustrations contained in this issue afford excellent evidence as to the manner in which the change is beneficial to the subscriber: it seems to us that it is unquestionably rendering better service to place in the hands of a subscriber at one and the same time all of the plates illustrating a given subject — "Wheatleigh," for example — than to dole them out to him two or three at a time during a succession of weekly issues more or less interrupted by the interpolation of dissociated material. One factor in the situation prejudicially affects the adoption of this new method of issuing the International illustrations in quarterly, in place of weekly, installments: we have been unable, as yet, to induce the postal authorities to allow us to send this quarterly issue through the mail prepared in such a way as to ensure it against damage in transit and place it in the subscribers' hands in a form that the quality and cost of the product requires and deserves. We have, however, prepared suitable heavy portfolio covers which can be mailed to any subscriber on the receipt of fifteen cents in stamps.

A BILL is pending before the New York Legislature to establish rules for the construction, ventilation and sanitation of school-houses and other public buildings, similar to those which have for several years been enforced in Massachusetts, to the very great advantage of school-children and other persons. The proposed New York law is very moderate in its demands in the matter of ventilation, requiring only fifteen cubic feet of fresh air per minute for each pupil in school-rooms, which is just half what Massachusetts children are by law entitled to, and, thanks to the efficiency of their good friends, the State inspectors, generally receive; but it would, perhaps, be difficult to enforce a more radical provision in New York at present. In other respects, the proposed law follows quite closely the statute of Massachusetts, and experience in the latter State has shown so clearly the great advantage to the public, and particularly to school-children, of such provisions that it can hardly be doubted that New York will adopt them. Architects of experience will remember that the Massachusetts law was passed with much difficulty. Nearly all "practical" persons ridiculed the idea of applying "theoretical" ventilation to school-houses, at least outside the great cities. They had learned to spell in school-houses heated by airtight stoves, or, in more advanced communities, by furnaces, which drew the air from the floor of the school-rooms, warmed it up, and sent it back into the rooms, in either case the same air, except so far as leakage around the windows, and transpiration through the walls might affect it, being served up through the entire winter. In extreme cases, a "ventilator" was provided, in the shape of a hole in the school-room ceiling, through which the hottest of the air escaped into the garret. In a community where such ventilation as this was the universal rule, and was perfectly satisfactory to all except a small group of "cranky" theorists, the task of introducing forced ventilation by law seemed hopeless, and there is good reason for suspecting that many of the legislators who voted for the passage of the bill never imagined that it would be enforced. For a time, in fact, its provisions were laughed at, but the inspectors quietly and perseveringly made their rounds, and, as one offender after another received a sharp admonition from the State officials, it began to dawn upon people that the new law was to be enforced. Even then, for many months it was systematically evaded. Multitudes of ventilation-fans, put in at the order of the Chief of the State Police, were operated only while the inspectors were looking on, and stopped as soon as their backs were turned; but even this reluctant concession showed people something of the difference between foul and fresh air, and the parents of the school-children soon began to interest themselves in seeing whether the law was complied with. A complaint from any one of these brought the State inspectors to the spot again, armed with their anemometers, and after a few school-houses had been ordered closed for non-compliance with the law, school-committees began grumblingly to prepare for obedience. All this was not very long ago, yet, since then, a great change has taken place. No architect in Massachusetts thinks now of planning a school-house without calculating the sizes of his ventilation-ducts, and studying the best position for them; and, if he neglects to do this, the State inspectors, who must approve the plans before they can be carried into execution, give him the necessary directions. When the school-house is built, if it is large enough to require steam-heating and fan-ventilation, a licensed engineer is engaged as a matter of course, not to stop the fan, and shut off the fresh air, as soon

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

as the inspectors are out of sight, but to keep the ventilating system in constant and efficient operation; and scholars, teachers and parents in Massachusetts, who now thoroughly appreciate the difference between good and bad air, would no more think of going back to the old system than they would of discarding their text-books of arithmetic, algebra, geography, Latin and French, and devoting their attention to the "New England Primer" and "Nature Display'd."

NEW HAMPSHIRE possesses a very energetic Society for the Protection of Forests, as well as some owners of forest land who are inspired with modern ideas in regard to their property. The latter have, within a few years, been quietly experimenting in forest planting, and the results are in the highest degree encouraging. Naturally, planting is done mostly with white pine, as this timber is easily grown in New Hampshire, and, owing to the exhaustion of the supply, brings a high price; and, as has been almost invariably the case where scientific forestry has been tried in this country, the rapidity of growth of the trees properly set out and cared for has surprised people accustomed only to the slow and uncertain increase of neglected forests. In one case, where young pines, five years old, were set out on a sandy hill twelve years ago, many of the trees are now seven inches in diameter, at two feet from the ground, and the thinnings alone are of considerable value. In another case, where a pine forest was carefully cut twelve years ago, so as to save the saplings, the latter are now beginning to furnish salable timber, ten years sooner than would have been the case under the usual management. While the more enlightened land-owners are carrying on practical experiments, the Society, which includes merchants and professional men, as well as forest-owners, is earnestly advocating a measure for the exemption from taxation of plantations of young pine, and pine forests scientifically managed, and it is hoped that it may be passed at the approaching session of the Legislature. If adopted, it will be, we think, the first statute of the kind in our timber-growing States, and its effect will be watched with great interest. So far as we can tell from the example of Germany, the result of such a law in New Hampshire should be to transform it rapidly from a rather declining community, with its principal wealth fast being stripped from it by railways and lumber corporations, into a prosperous and animated one, busily employed in producing and converting into valuable goods the unrivalled timber which Nature has given only to four or five of the States on the Atlantic slope, at the same time that it is storing up wealth, happiness and comfort for future generations. We have been told for the last fifty years that the decline of population in Maine, New Hampshire and Vermont was due to the fact that their inhabitants depended upon farming, and that the farmers in the Mississippi Valley could undersell them. The people of Vermont have had the good sense, instead of trying to compete with the Kansas farmers in raising wheat, to dig up, cut and send to market the beautiful marbles of which their State possesses an inexhaustible variety, and are beginning to be prosperous once more; and Maine, New Hampshire and Massachusetts have, in their soil and climate, unlimited resources for the perennial production of a timber which will grow in perfection nowhere else, except in portions of Pennsylvania and the Lake regions, for which there is a demand absolutely without limit, owing to its superiority to any other timber ever discovered, at prices three times as high as those which brought enormous fortunes to the owners of the pine lands of the last generation. To make available, however, the wealth which lies dormant in the soil of the white-pine States, patience and self-denial are necessary for a few years; and, as individuals without resources are unable to practise self-denial of this sort, it is indispensable that the State should help, if not by doing something to support the forest-planter and his family until his trees begin to be marketable, at least by relieving him of the burden of taxation. It must be remembered that, while a farmer can easily deduct a reasonable annual tax from the price of his yearly crops, the forest-planter has absolutely no resource, until his trees are marketable, for meeting taxation, except by taking from the scanty savings which he has been able to lay by in some other employment. No one can reasonably be expected to assume this burden, in addition to the heavy outlay required for starting a productive forest, and, until some distinction is made by the State authority, in which the difference between forest planting and potato raising is recognized, no general interest in forestry, on the part of people who own forest lands, can be hoped for.

THE Peabody Museum of American Archæology of Harvard University, aided by contributed funds, recently fitted out an expedition to Copan, in Honduras, under the direction of Mr. George P. Gordon, which has done an excellent preliminary work in clearing and recording the hieroglyphic inscriptions on what is known as the Great Stairway, which leads from the plain up what seems to be an artificial pyramid, once, probably, crowned with a temple. The faces of the steps of the stairway were covered with hieroglyphic inscriptions, and the balustrade was sculptured with symbolical figures, while at least five statues stood at regular intervals on the steps and landings. When the Harvard expedition reached the spot, the ruins were buried in débris, and it has taken four years of labor to clear them. The whole stairway proves to have consisted of some seventy steps, each twenty-five feet long, the lower step being wider than the others. The lower step is not ornamented, but all the others are decorated on the face with hieroglyphics, in panels, interrupted occasionally by sculptured figures. All the figures seem to be in some way symbolic. Some of them hold in their hands a fish, which is very common in Central American sculpture, and seems to have some sacred significance; others are connected in some way with serpents, the rattlesnake being often shown; and serpents, alternating with figures of birds, form the decoration of the richly-carved balustrade. Of the statues which stood on the stairway many fragments remain, showing that they must have represented sitting figures, generally crowned with enormous head-dresses of plumes, sometimes mingled with serpents, and wearing, in at least one case, a breastplate representing a death's head, very much as Athena wore the head of Medusa. At the foot of the staircase are the remains of what is supposed to be an altar, having the form of some enormous animal, but now headless, and otherwise defaced. Some fragments of the sculpture show traces of colored stucco over the stone, and Mr. Gordon is inclined to believe that the whole of the staircase, with its balustrades, was once covered with stucco in this way. Of the temple to which the staircase led, nothing now remains in place, but many fragments of it are mingled with those of the staircase. In excavating to determine the form of the foundations of the temple, and the terraces which were connected with it, Mr. Gordon made the very interesting discovery that they rested on the remains of still older buildings, and, in some places, the traces of several distinct layers of débris were found, indicating that, as at Troy, the sacred Acropolis of Copan had been several times built over, in successive ages, the earliest structures dating, apparently, from an antiquity perhaps more remote than any yet known to archæology.

PEOPLE who expect to go to London to witness the coronation of King Edward the Seventh next June will do well to avoid standing on the balconies of London houses to see the coronation procession, or any similar sight. A few days ago, some people were standing on the balcony of a house on Pembroke Square, in London, when the whole affair suddenly broke down, dropping the people on it into the area below. It appeared, on examination, that the iron supports of the balcony were fixed in a stone string-course which ran across the front of the house, and this string-course had split off for its whole length. It is probable that the rusting of the iron, where it was set into the string-course, had begun to split the stone, and a small additional strain was sufficient to cause its separation. There are numberless examples in this country of such splitting of stone, particularly of the hardest kinds, by the rusting of fence-posts, or other pieces of ironwork, fixed in it. The lead and sulphur generally used to secure the iron in its place are said to increase the disposition to rust, this being particularly the case with sulphur; and after some years, the stone around the point of insertion of the iron begins to split in the direction of least resistance, which is usually that of the length of the stone. Occasionally, the granite base of a long cemetery railing, or yard-fence, may be seen split from end to end in this way, and architects expect, as a matter of course, to find cracks in stonework in which iron has been set for any considerable time. Quite recently, some architects have discarded lead and sulphur for setting iron in stone, and have used clear Portland cement in place of them. Theoretically, this should diminish the tendency to rust, and an examination of ironwork so set might furnish valuable information in regard to the all-important question of preserving iron in contact with masonry from corrosion.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — VI.

THE rivets used in structural work are of a low-grade steel, and the usual sizes range from $\frac{5}{8}$ inch to 1 inch in diameter, $\frac{3}{4}$-inch diameter rivets being the most used; $\frac{7}{8}$-inch and 1-inch diameter rivets are used where the plates and rolled shapes are heavy, or where the grip of the rivet — *i. e.*, the distance from head to head — is great; $\frac{5}{8}$-inch rivets are only for light work, principally for light trusses, stair and other architectural ironwork.

A joint will fail in two ways, *i. e.*, by the shear of the rivets or by the crippling of the plate around the rivet-holes. The rivets never fail by bending, and their transverse strength is never considered. Rivets may be in either single or double shear, and the bearing of the plate may be either ordinary or web bearing. Single shear is where the rivet tends to shear through one section only, as along the line *a a* in Figure 35, while double shear is where the rivet tends to shear across two sections, as shown along the lines *b b* in the same figure. Web-bearing exists in a plate held between two side plates so that the bearing around the rivet-hole is in a direct line — *i. e.*, there is no side pull upon the middle plate. The plates marked *c* and *d* in Figure 35 are in ordinary bearing, while the plate marked *e* is in web-bearing. The allowable unit shearing-value for steel rivets in building-construction is 7,500 pounds, while the allowable unit bearing-value is 15,000 pounds; higher values than these can be used when the material or workmanship is of exceptional quality, or economy demands it. The single shearing-value of any rivet is equal to the area of the rivet multiplied by the allowable unit shearing-stress, while the double shearing-value of any rivet is twice the single shear. The ordinary bearing-value of a plate is usually taken as the diameter of the rivet multiplied by the thickness of the plate multiplied by the allowable unit bearing-value. Where the plate is in web-bearing it is customary to take one and one-half times the ordinary bearing as the allowable bearing-value. When several rolled-steel shapes are held together by rivets which are driven when hot, there is a tendency of the rivets to clamp the plates or grip them by the contraction of the rivets on cooling. While experiments show that the rivets grip the plates to a certain extent and prevent them from sliding one past the other, they have also proved that the amount of this gripping or clamping tendency is indeterminate; it is, therefore, not considered in the design of structural work.

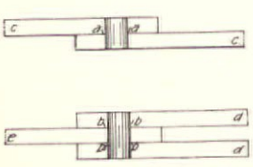


Fig. 35.

THE SHEARING-RESISTANCE OF RIVETS AND THE BEARING-VALUE OF PLATES OF DIFFERENT THICKNESSES.

Diameter of rivet.	Area of rivet.	Single shear, 6,000	Double shear, 12,000	Bearing-value for different thickness of plate — Unit-value = 12,000.							
				$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$
$\frac{3}{8}$	.1105	668	1,325	1,125	1,406	1,688					
$\frac{1}{2}$	.1964	1,178	2,356	1,500	1,875	2,250	2,625	3,000			
$\frac{5}{8}$	.3068	1,841	2,682	1,875	2,344	2,813	3,281	3,750	4,219	4,688	
$\frac{3}{4}$	.4418	2,651	5,301	2,250	2,810	3,375	3,938	4,500	5,063	5,625	6,188
$\frac{7}{8}$	.6018	3,608	7,216	2,625	3,281	3,938	4,594	5,250	5,908	6,563	7,219
1	.7854	4,712	9,425	3,000	3,750	4,500	5,250	6,000	6,750	7,500	8,250
Diameter of rivet.	Area of rivet.	Single shear, 6,750	Double shear, 13,500	Bearing-value for different thickness of plate — Unit-value = 13,500.							
				$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$
$\frac{3}{8}$	.1105	746	1,491	1,266	1,582	1,898					
$\frac{1}{2}$	.1964	1,325	2,651	1,688	2,109	2,531	2,953	3,375			
$\frac{5}{8}$	.3068	2,071	4,142	2,109	2,637	3,164	3,691	4,219	4,746	5,273	
$\frac{3}{4}$	.4418	2,982	5,964	2,531	3,164	3,797	4,430	5,063	5,659	6,328	6,961
$\frac{7}{8}$	.6013	4,059	8,118	2,953	3,691	4,430	5,168	5,908	6,645	7,383	8,121
1	.7854	5,301	10,603	3,375	4,219	5,063	5,906	6,750	7,594	8,438	9,281
Diameter of rivet.	Area of rivet.	Single shear, 7,500	Double shear, 15,000	Bearing-value for different thickness of plate — Unit-value = 15,000.							
				$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$
$\frac{3}{8}$	.1105	828	1,656	1,406	1,758	2,109					
$\frac{1}{2}$	.1964	1,473	2,945	1,875	2,344	2,813	3,281	3,750			
$\frac{5}{8}$	.3068	2,301	4,602	2,344	2,930	3,516	4,102	4,688	5,273	5,859	
$\frac{3}{4}$	.4418	3,313	6,627	2,813	3,516	4,219	4,922	5,625	6,328	7,031	7,734
$\frac{7}{8}$	.6013	4,510	9,020	3,281	4,102	4,922	5,742	6,563	7,383	8,203	9,023
1	.7854	5,891	11,781	3,750	4,688	5,625	6,563	7,500	8,438	9,375	10,313
Diameter of rivet.	Area of rivet.	Single shear, 10,000	Double shear, 20,000	Bearing-value for different thickness of plate — Unit-value = 20,000.							
				$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$
$\frac{3}{8}$	.1105	1,105	2,209	1,875	2,344	2,813					
$\frac{1}{2}$	.1964	1,964	3,927	2,500	3,125	3,750	4,375	5,000			
$\frac{5}{8}$	.3068	3,068	6,136	3,125	3,906	4,688	5,469	6,250	7,031	7,813	
$\frac{3}{4}$	.4418	4,418	8,836	3,750	4,688	5,625	6,563	7,500	8,438	9,375	10,313
$\frac{7}{8}$	.6013	6,013	12,026	4,375	5,469	6,563	7,656	8,750	9,844	10,938	12,031
1	.7854	7,854	15,708	5,000	6,250	7,500	8,750	10,000	11,250	12,500	13,750

NOTE. — All values between the heavy lines are greater than the single shear of the rivets and less than the double shear; so that, if the rivet is in single shear, that value is used, while, if the rivet is in double shear, the bearing-value of the plate is taken in designing the connection.

Since a riveted joint or connection may fail, either by the shearing of the rivet or the crippling of the plate, it is necessary to analyze both values, and to determine where the failure is likely to occur, for the strength of the joint or connection depends upon the strength of its weakest part.

In order that the resistance of rivets or the bearing-value of the plates may readily be determined, a table such as the foregoing is often prepared; this table gives the shearing and bearing values for rivets of different diameters, and for plates of different thicknesses when different shearing and bearing values are considered. It will be found convenient for reference in all future calculations.

In structural work there are certain practical considerations

[1] Continued from No. 1368, page 85.

besides mere strength, that determine the spacing of rivets. These rules are practically standard.

In order that the rivet-hole may not pull out at the end of a plate, it is usual to make the distance from the centre of the rivet-hole to the edge of the plate not less than one and one-half times the diameter of the rivet, nor greater than eight times the thickness of the plate, while the minimum distance from the centre of a rivet-hole to the side edge of a plate should be one-half of the diameter of the rivet, plus one-half the thickness of the plate, plus $\frac{1}{8}$ inch. Rivets should never be placed closer together than three times the diameter, and the pitch should not exceed sixteen times the thickness of the thinnest outside plate, provided such a distance does not exceed 6 inches, though in plate-girder work it is sometimes found advisable to space rivets as far apart as 9 inches. Where rolled-plates are in compression, the maximum pitch in the direction of the stress should never exceed sixteen times the thickness of the plate, nor thirty-two times the thickness of the plate in a direction at right angles with the line of stress. Exception to this rule exists in cover plates of deep chords and end posts in a truss, where the pitch may be as great as forty times the thickness of the plate. At the end of compression-members the pitch should not exceed four times the diameter of the rivet for a length equal to twice the width of the member, while the pitch throughout the balance of the length may be made the maximum. The following table gives data regarding rivet-spacing which will be of value in the design of structural members: —

TABLE OF RIVET-SPACING GIVING MAXIMUM AND MINIMUM DISTANCES IN INCHES.

Size of rivet.	Minimum pitch.	Maximum pitch at the ends of columns and compression-members.	Minimum pitch in the flanges of girders.	Distance from edge to centre of rivet-holes.	
				Minimum.	Usual.
$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{2}$	3	$1\frac{5}{16}$	$1\frac{1}{4}$
$\frac{7}{8}$	$1\frac{3}{4}$	3	3	$1\frac{1}{16}$	$1\frac{3}{8}$
1	2	$3\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{3}{16}$	$1\frac{3}{4}$
$1\frac{1}{8}$	$2\frac{1}{4}$	4	4	$1\frac{1}{2}$	2

It is customary in designing riveted connections that are to be put together in the field to allow 25 per cent greater resistance in the rivets than was employed in the shop-work. This is to allow for defects in workmanship and material, for in the field it is difficult to drive the rivets perfectly, and in extremely cold weather they are likely to be cooled very rapidly and driven at a low heat, the heads, in consequence, being very brittle and the rivets being insufficiently upset to fill the holes. In all rivet-work put together in the shop the holes are punched $\frac{1}{16}$ inch larger than the rivet. They should be made true to a templet, and no drift-pins should be used to bring the work together. It is advisable to drill all of the rivet-holes for field-connections, and these holes should be drilled while the pieces are securely clamped or bolted in correct juxtaposition. If they are punched they should be reamed so that excessive drifting in the field will be avoided. Rivets may be driven in shop or field; they may be countersunk on one or both sides or flattened. To designate upon a drawing in what manner the rivets should be driven it is customary to use Osborne's code. This code is shown in Figure 36 and is easily remembered after careful observation.

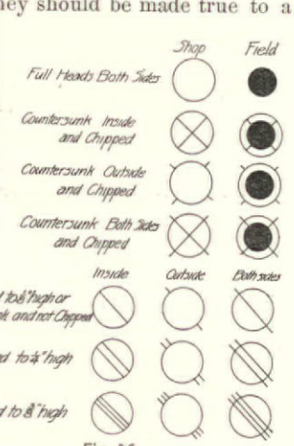


Fig. 36.

It is necessary in designing plate girders to have sufficient rivets through the vertical leg of the flange angles, in order to transmit the stress from the web to the flanges. Theoretically, the pitch of the rivets through the vertical leg of the flange angles would vary from the abutments to the centre, the rivets being placed very closely together at the abutment and extremely far apart towards the centre of the span. In order to facilitate work in the shop it is usual to provide only two or, at the most, three different pitches throughout the length of a girder. Where the girder is divided by the stiffeners into panels and the length of the panel is equal to the depth of the girder, the pitch of the rivets in the vertical leg of the flange angles between any two stiffeners may be determined by dividing the vertical shear at the stiffener nearest the abutment by the allowable value for one rivet, and by dividing this result,

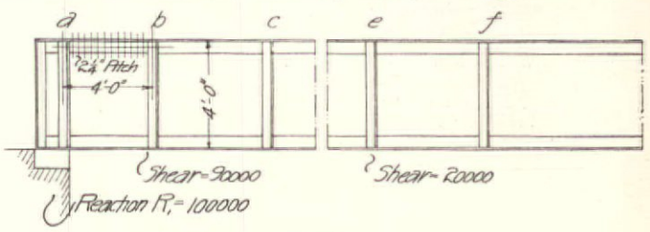


Fig. 37.

which is the number of rivets required between the two stiffeners, into the distance in inches between the stiffeners or the depth of the girder. For instance, it is desirable in Figure 37 to obtain the rivet-spacing between the points *a* and *b*. These points are 4 feet apart, which is the depth of the girder; the reaction R_1 equals 100,000 pounds. According to the above, therefore, the number of rivets required between *a* and *b* is equal to 100,000 pounds divided by the allowable resistance for one rivet. Supposing that the rivets are $\frac{3}{4}$ inch in diameter, the shearing and bearing values may be found from the foregoing table. The allowable unit shear is 6,000 pounds and the unit bearing-value is 12,000 pounds, so that a $\frac{3}{4}$-inch rivet through a $\frac{5}{16}$-inch web-plate and $\frac{3}{8}$-inch flange angles will have an allowable value equal to the web-bearing of a $\frac{5}{16}$-inch plate, or one and one-half times 2,810, which gives 4.215; then $100{,}000 \div 4{,}215 = 23.7$, or 24 rivets; dividing 24 into 48 inches, the distance between *a* and *b*, the pitch of the rivets, is ascertained to be 2 inches; this is somewhat below the minimum pitch, which, as previously stated, should never be less than three times the diameter of the rivet; it would, therefore, be good practice to pitch the rivets between *a* and *b* as near as possible to $2\frac{1}{4}$ inches.

Again, assume that it is desired to determine the pitch of the rivets between *b* and *c*. The shear at *b* on the girder is found to be 90,000 pounds; therefore 90,000 pounds $\div$ 4,215 = 21.3, or 22 rivets; consequently, the pitch between *b* and *c* is equal to $48 \div 22 = 2.18$; this pitch is theoretical, and would probably be made the minimum pitch. At a panel nearer the centre of this girder, as at *e*, the shear is 20,000 pounds; then the number of rivets required between *e* and *f* would equal $20{,}000 \div 4{,}215$, or 4.7, say 5 rivets; $48 \div 5 = 9.6$ inches, the theoretical pitch between *e* and *f*; this greatly exceeds the allowable pitch for rivets in a compression-member. Since the upper flange is practically a compression-member, the rivets must be spaced not farther apart than 6 inches; the rivets throughout the girder then would probably be spaced through the first two panels $2\frac{1}{4}$ inches; through the next two, 3 inches; the next two, 4 inches, and throughout the remaining portion of the girder, 6 inches.

A somewhat similar method, though more accurate, for proportioning the rivets through the flange angles and web-plate of a girder is to determine the increment of stress transmitted from the web-plate to the flange angles at each point. The maximum increment of the horizontal flange stress at any point in the length of a plate-girder is equal to the shear at that point divided by the depth of the girder in inches; consequently, if the increment for each inch in length may be determined, the pitch of the rivets may readily be ascertained by dividing

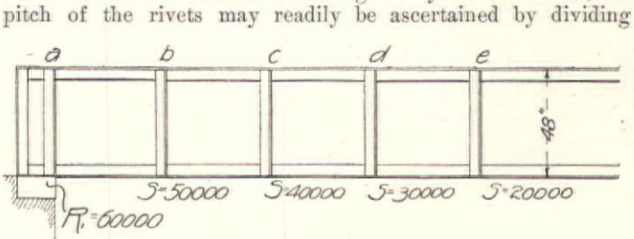


Fig. 38.

the allowable resistance of one rivet by the increment. Assume that it is desired to proportion the rivets throughout the vertical leg of the flange angles in the girder shown in Figure 38 and also assume that the allowable resistance of one rivet is

4,000 pounds; the reaction R_1 equals 60,000 pounds, and the increment of stress at a, b, c, etc., is as follows: —

Increment a = shear a = 60,000 pounds ÷ 48 = 1,250
Increment b = shear b = 50,000 pounds ÷ 48 = 1,042
Increment c = shear c = 40,000 pounds ÷ 48 = 833
Increment d = shear d = 30,000 pounds ÷ 48 = 625
Increment e = shear f = 20,000 pounds ÷ 48 = 417

Since the allowable resistance of a rivet equals 4,000, then the pitch of the rivets between the several points is as follows: —

Between a and b = 4,000 ÷ 1,250 = 3.2
Between b and c = 4,000 ÷ 1,042 = 3.8
Between c and d = 4,000 ÷ 833 = 4.8
Between d and e = 4,000 ÷ 625 = 6.4
Between e and f = 4,000 ÷ 417 = 9.6

From the above tabulation, in practice the girder would be designed with rivets pitched 3 inches apart in the first panel, 4 inches apart in the next, while between c and d would probably have the rivets spaced 5 inches apart, the rivets throughout the remaining length of the girder being spaced the maximum distance, namely, 6 inches.

The rivet-spacing in the vertical leg of the flange angles may be determined by another method, which consists in calculating the bending-moment at the several panel points, and then determining the flange stress at these points. When the flange stress has been determined at any point, the number of rivets between that point and the abutment may be determined by dividing the flange stress by the allowable resistance of one rivet.

Example. — The girder shown in Figure 39 is loaded with a

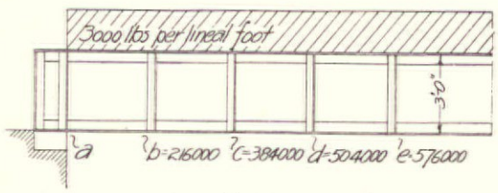


Fig. 39.

uniformly distributed load of 3,000 pounds per lineal foot, and the bending-moment at a, b, c, d and e is as follows: —

a = 0 foot-pounds.
b = 216,000 foot-pounds.
c = 384,000 foot-pounds.
d = 504,000 foot-pounds.
e = 576,000 foot-pounds.

The flange stress at the several points is, therefore, as follows: —

a = 0 ÷ 3 = 0
b = 216,000 ÷ 3 = 72,000
c = 384,000 ÷ 3 = 128,000
d = 504,000 ÷ 3 = 168,000
e = 576,000 ÷ 3 = 192,000

From the above data the number of rivets between b and a may be found by dividing the flange stress by the allowable resistance of one rivet, likewise the number of rivets between c and a may be found by dividing the flange stress at c by the allowable value for one rivet; by deducting from the number of rivets required between c and a, the number of rivets necessary between b and a, the rivets between c and b may readily be found. Likewise the rivets between d and c may be obtained by deducting from the number of rivets required between d and a the number of rivets necessary between c and a. Having the number of rivets between each of the panel points, the pitch may readily be found by dividing the number of rivets into the distance between the centres of the stiffeners. If in the girder in question the allowable resistance of one rivet is 4,000 pounds, the number of rivets between the several points may be obtained by the following calculation: —

Number of rivets, a to b = 72,000 ÷ 4,000 = 18
Number of rivets, a to c = 128,000 ÷ 4,000 = 32
Number of rivets, a to d = 168,000 ÷ 4,000 = 42
Number of rivets, a to e = 192,000 ÷ 4,000 = 48

Then

Number of rivets, a to b = 18
Number of rivets, b to c = 32 — 18 = 14
Number of rivets, c to d = 42 — 32 = 10
Number of rivets, d to e = 48 — 42 = 6

and,

Pitch of rivets, a to b = 48 ÷ 18 = 2.66 inches.
Pitch of rivets, b to c = 48 ÷ 14 = 3.43 inches.
Pitch of rivets, c to d = 48 ÷ 10 = 4.8 inches.
Pitch of rivets, d to e = 48 ÷ 6 = 8 inches.

Besides these several analytical methods the rivet-spacing in the flange-angles may readily be determined graphically by the

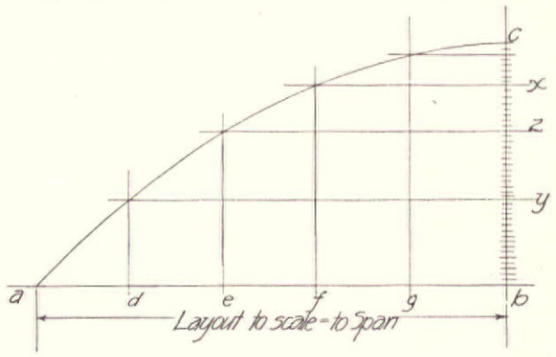


Fig. 40.

use of the parabolic curve, as explained in connection with the shortening of the flange-plates; that is, of course, where the girder is uniformly loaded. Figure 40 shows parabolic curve a-c; the line $c\,b$ is laid off into as many equal parts as there are rivets required between the centre of the girder and the abutments. The number of rivets may be determined by any of the above-described methods, *i. e.*, by calculating the flange stress at the centre of the girder by means of the formula $\frac{W\,L}{D\,8}$, in which W equals the uniform load upon the girder, L the length of the girder in feet, and D the depth of the girder in feet. The distance $a\,b$ in Figure 40 is laid off to scale equal to one-half of the span of the girder, and at the points where it is desired to change the pitch of the rivets, as at d, e, f, g, etc. (these points being usually located at the centre line of the stiffeners), extend upward the ordinates as shown until they intersect the parabola; from these points of intersection describe the horizontal lines, and by counting the number of divisions between these horizontal lines, the number of rivets between the several panel points, or points at which it is desired to change the pitch, may be determined. For instance, in the figure the number of divisions between b and y denotes the number of rivets required between a and d, while the number of rivets between d and e, and e and f, may be determined by counting the number of division between $y\,z$, and $z\,x$ respectively. By making a general diagrammatic scale having for its principle this method, a convenient means of obtaining the number of rivets required through the vertical leg of the flange-angles may be obtained.

In spacing the rivets through the horizontal leg of the flange angles — that is, through the cover-plates — it is good practice to place sufficient rivets in the end of each cover-plate, pitched at a distance not farther apart than four times the diameter of the rivet in order to equal in resistance the net sectional area of the plate; the rivets throughout the remaining length of the plate being spaced at the maximum pitch. For instance, in a $12'' \times \frac{1}{2}''$ plate there are two $\frac{7}{8}$-inch rivet-holes in a straight line across; in consequence, the net area of the plate is practically 5 inches; if the allowable unit-stress of the material is 15,000 pounds, the net strength of the plate is 75,000 pounds.

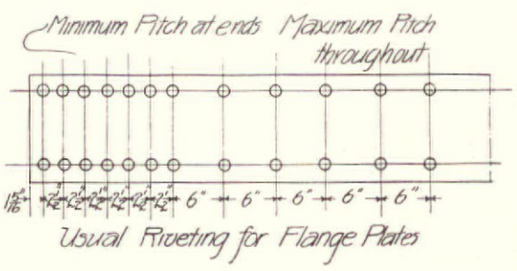


Fig. 41.

Provided the rivets have an allowable resistance of 6,000 pounds, there will be required in the end of the cover-plate 75,000 ÷ 6,000, or 12.5 rivets, or 13. As this is an odd number, and because the rivets are spaced symmetrically along

each edge of the cover-plate, 14 rivets will be required in the end. These will be spaced as shown in Figure 41; the remaining rivets throughout the length of the cover-plate being 6 inches.

It is difficult to obtain rolled angles and plates longer than 70 or 80 feet — *i. e.*, when they are of any size; it is, therefore, often necessary to splice both the cover-plates and flange-angles. It is not necessary that all splices in the upper chord be heavy, because they are only needed to keep the plates and angles in alignment, since this portion of the girder is in compression, but where it is necessary to provide splices in the lower flange of the girder, care should be taken in proportioning the splice to obtain the greatest percentage of strength, and sufficient rivets must be placed in each side of the abutting joint to equal the net resistance of the rolled section. Wherever possible these splices should be placed as near as possible to the abutments, because at such points the bending-moment is less. Where the flange-angles are spliced, the splices should not occur opposite each other — *i. e.*, the joints should be broken.

The application of the several principles and rules set forth in the foregoing will be demonstrated in a future article, which will show the general design and several details of construction for plate-girders, and their connections to structural-steel columns such as would commonly be used in building-construction.

M. M. Sloan.

[To be continued.]

LA HUNAUDAYE, BRITTANY.

THERE are many crumbling old ruins in France and not a few in Brittany, but none more lonely or forgotten than that of the castle of La Hunaudaye, buried in a forest that looks as if it had not changed in the last thousand years.

The forest of La Hunaudaye, or forest of Laumor, as it was also called, was, in the Middle Ages, a rendezvous for all the brigands of the country. They used to attack travellers who passed that way and were not sufficiently guarded. Among those who suffered was the Bishop of Saint-Brieux, who, one day in the fourteenth century, was attacked by these ruffians while crossing the forest and only liberated on his promising to pay a heavy ransom, losing at the same time his horses and all his baggage. The trees of this forest were principally oak, beech and chestnut — that truly Breton tree, which also furnished a thick undergrowth in which the wild boar was often found. Badgers and squirrels are at the present time its most dangerous inhabitants, although, if the winter is severe, it is not uncommon to see a pack of hungry wolves come stealing out in quest of prey which they failed to find in its dark retreats.

It was not only on account of the atrocities committed by its robbers that the forest of La Hunaudaye was famous; far greater was the terror caused to all the Breton peasants by its owner, the noble and puissant Seigneur Tournemine de la Hunaudaye, whose magnificent castle, built in the years 1214–1220, was noted in the annals of Breton chivalry. Its architect, says Freminville, wished to unite elegance with strength. The castle, standing in the centre of the forest, was in shape heptagonal, flanked by seven towers a good deal higher than the main building and surmounted by turrets. In addition to these, two other towers protected the entrance, one on each side, the whole surrounded by a double moat; the walls were about forty feet in height and of great thickness. Both walls and towers were surrounded by outstanding parapets so that, in case of attack, boiling oil and melted pitch might be poured on the besiegers. In the centre of the court was a deep well, where the inhabitants could always get their supply of water in times of war.

But none of this original splendor longer exists, for during the French Revolution violent hands were laid on the castle, as on so many others, and it suffered the same fate; its owner was forced, by order of the directors of the district of Lamballe, a town some fifteen miles distant, to set fire to his own castle, lest it should fall into the power of the Royalist army. It was then the property of Mme. de Talhouet, a descendant of the family of Tournemine. It is said the fire lasted eighteen days before it burned itself out.

The prison-tower in particular attracts the attention of the visitor of the present day, its walls being covered with inscriptions or figures carved on the stones by the prisoners who had been detained there. One of the figures is an infant swathed according to the custom of the country; another, a cross and stars. This is the only apartment that still keeps its roof; it was stone-vaulted, and so resisted the fire. The entrance to the prison is easily recognized, as there are triple doors, and in the wall holes or sockets into which the bolts were shot; besides, there are other and deeper holes, where bars of iron could be placed across for greater security. In the centre of the castle stood the chapel, its Gothic windows and carved doors bearing testimony to its pristine beauty. Directly under the chapel is the entrance to a subterranean passage, its secret door having been burned away with all the rest. Should any one be tempted to explore this dismal route he will encounter complete darkness, a cold, damp feeling and a most peculiar noise, caused by a multitude of bats escaping from the unusual sight of a visitor to their abode, for few strangers go to La Hunaudaye, and the peasants rarely go inside the castle at all, much less would they venture into the gloom of its underground mysteries. If you ask why, you would probably get the same answer as did the writer from an aged peasant living on the farm close at hand, who told this tale in Breton-French:

"Some hundred years ago, monsieur," said he, "the castle was owned by Seigneur de Tournemine, an atrociously cruel man, who, in order to get possession of it, killed his father and his elder brother. His wife, who was a good woman, often reproached him with his crime, so he got rid of her in the same way. A few days after he had murdered her, a dreadful storm arose. It was late at night, and the Seigneur was sitting in his room when a loud knock sounded at the door. The sentinels had not observed any one come down the avenue, which, as you see, is over a mile long. However, a tall man, dressed in red, was ushered into the Seigneur's presence. Every one was greatly astonished to find that, although it was raining in torrents outside, his clothes were perfectly dry. 'Who art thou?' said De Tournemine, 'and how dare you come into my castle without a retinue at this hour of night?' 'My retinue is present,' answered the strange visitor. 'Let them appear,' and instantly the three figures of the father, brother and wife became visible. All were ghastly white and wrapped in shrouds, which they opened, and showed the blood pouring from their wounds. Then the cavalier in red said: 'Baron, I have no other guard,' and pointing to the eldest of the three spectres he added, 'There is your father, a holy old man, who was slain by a dagger thrust. There,' turning to the younger, 'is your brother, and there is your wife. You are the murderer of all three, and you know it.' Then the three ghosts laid hold of the Seigneur de Tournemine and he fell dead at their feet. The man in red laughed and all four vanished. During this time the lightning was rending the skies and peal after peal of thunder reverberated in the valleys."

Such is the legend of La Hunaudaye, and the country-folk believe that the castle is still haunted by the mysterious four. — *N. Y. Tribune.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

TENTATIVE SKETCHES FOR "WHEATLEIGH": HOUSE OF H. H. COOK, ESQ., LENOX, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

PRELIMINARY STUDY FOR THE SAME.

TERRA-COTTA DETAILS FROM THE SAME.

STATUE OF "HELVETIA" IN THE ENTRANCE-HALL OF THE UNION BANK BUILDING, ZURICH, SWITZERLAND. RICHARD KISSLING, SCULPTOR.

[The following named illustration may be found by reference to our advertising pages.]

THE CHÂTEAU DE CLAMBEAU, NIÈVRE, FRANCE. M. NARJOUX, ARCHITECT.

This plate is copied from *La Construction Moderne.*

[Additional illustrations in the International Edition.]

"WHEATLEIGH": HOUSE OF H. H. COOK, ESQ., LENOX, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.:—

THE ENTRANCE-FRONT.

MAIN ENTRANCE.

A GATE-POST.

REAR ENTRANCE-ARCADE.

SIDE VIEW.

LAWN FRONT.

GARDEN FRONT.

HARVARD UNION, H. U., CAMBRIDGE, MASS. MESSRS. McKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.:—

THE REAR VIEW.

EAST END OF LIVING-ROOM.

WEST END OF LIVING-ROOM.

DETAILS OF INTERIOR TREATMENT OF THE HOUSE OF COLONEL GUFFEY, PITTSBURGH, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.: SIX PLATES.

HOUSE OF GIRAUD FOSTER, ESQ., LENOX, MASS. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.: —

THE SOUTH FRONT.

THE VESTIBULE.

THE MAIN HALL.

MANTELPIECE IN THE MAIN HALL.

THE MAIN STAIRCASE.

THE PALM-HOUSE.

THE PALM-HOUSE ENTRANCE.

THE DINING-ROOM.

THE DEN.

THE LIVING-ROOM.

A FIREPLACE IN THE LIVING-ROOM.

A CORNER IN THE PARLOR.

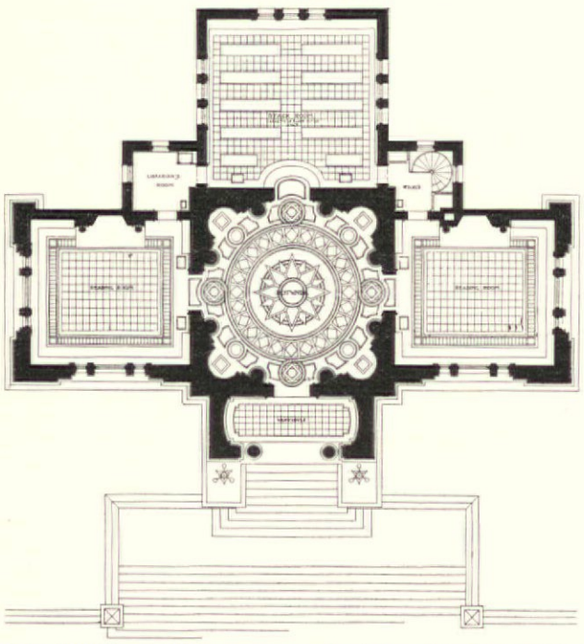
FIREPLACE END OF THE PARLOR.

THE FIELD MEMORIAL LIBRARY, CONWAY, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.: —

THE MAIN FRONT.

ENTRANCE PORTICO.

THE DELIVERY-ROOM.



"ELM COURT": HOUSE OF W. D. SLOANE, ESQ., LENOX, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.: —

THE LAWN FRONT.

THE NEW FRONT.

THE ENTRANCE FRONT.

SIDE ENTRANCE.

STATUES FROM THE MAXIMILIAN TOMB, INNSPRUCK, TYROL, AUSTRIA: FOUR PLATES. DRAWN BY A. C. CONRADE.

THE tomb of Maximilian I in the Hofkirche at Innspruck is one of the most remarkable memorials that exist, partly because the tomb does not enclose the remains of the Emperor, who was actually sepulchred at Wiener Neustadt, and partly because, besides the marble tomb itself, adorned with twenty-four bas-reliefs and a bronze effigy of the Emperor kneeling upon the top, the memorial includes a remarkable series of colossal bronze statues, twenty-eight in number, that stand on a stylobate in the intercolumniations of the nave and the transept crossing. These statues are, in the main, the work of Gregory Löffler, that is, the best of them are his work, while others are due to the lesser skill of the brothers Godl. We believe that some of the series were never finished and set in place and are represented by incomplete fragments which still lie in a storeroom, the process of founding and erecting having been interrupted by the wars of the period. Should any one try to assemble a complete statue from this mass of *disjecta membra* a successful result would doubtless be impossible, since, during the wars referred to, much of this bronze material was seized, put into the melting-pot, and converted into arms of such precision as the advance of military science at that time made possible. Nevertheless, the task has been essayed and the figure of "Theodobert, Duke of Burgundy" is the result. It is said that sculptors nowadays have no difficulty in deciding that the sculptor entrusted with the task assembled the wrong fragments and produced a compound result very different from that intended by the original artist. At all events, this meddler was a man of such inferior prowess that he was unable to model a likeness of the Duke, and to disguise his incompetence represented the Duke with the visor of his jousting-helmet lowered.

STATUES FROM THE MAXIMILIAN TOMB, INNSPRUCK: SEVEN PLATES. DRAWN BY MR. C. HOWARD WALKER, ARCHITECT, BOSTON, MASS.

WHEN, a few weeks ago, we came upon, in the *Builder*, Mr. Conrade's interesting drawings of some of the statues in the nave of the Hofkirche, we were at once reminded of the very complete and remarkable water-color drawings exhibited at the Boston Art Club last year by Mr. C. Howard Walker, and we thought it would be interesting, merely as an exhibition of comparative draughtsmanship and artistic skill and feeling, to reproduce those of Mr. Walker's drawings which depicted the same figures drawn by Mr. Conrade. We little imagined that when placed side by side such singular and inexplicable variations and discrepancies would be revealed, and knowing the full history of Mr. Walker's work and his ability, skill and accuracy, we cannot but wonder where Mr. Conrade procured the data on which he founded his drawings. Not upon photographs, evidently, first, because, with the exception of the "King Arthur" and one or two more, the figures have never been allowed to be photographed, and, next, because had they been founded on photographs there would not have existed the discrepancies between them and Mr. Walker's careful work. Sceptres and swords would not appear in hands that Mr. Walker found empty; sword-hilts and daggers would not appear on the wrong side, and the form and position of armorial shields would have been alike in both sets of drawings. A justifiable inference is that Mr. Conrade founded his drawings, made in 1901, on some older published sketches secured at a time when the prohibition against drawing and photographing in the Hofkirche was not so strictly enforced as now.

We will leave to Mr. Walker to tell at another time and in another place the interesting story of how, by address, persistence and a goodly allowance of Yankee shrewdness, he at length secured permission to sketch a few of the statues — which it seems are not so much Crown property as a part of the personalty of the Emperor Francis Joseph — and how by the use of an allowable subterfuge and the speediest of workmanship he managed to expand his "few sketches" into a practically complete record of the entire series. As shown on the walls of the Art Club two years ago, the drawings formed one of the most interesting exhibits that were ever hung there, and formed an impressive monument of industry, perseverance and artistic skill.

A MONUMENT TO THE MEMORY OF M. EDOUARD REMY, LOUVAIN, BELGIUM. M. P. BRÄCKE, SCULPTOR.

THIS plate is copied from *L'Emulation*.

VIEWS AT THE PAN-AMERICAN EXPOSITION, BUFFALO, N. Y. AFTER PHOTOGRAPHS BY MR. CONRAD BAER, BUFFALO, N. Y.: —

THE ELECTRIC TOWER. MR. JOHN GALEN HOWARD, ARCHITECT, NEW YORK, N. Y.

"GEN. W. T. SHERMAN": MODEL OF EQUESTRIAN STATUE FOR NEW YORK, N. Y. MR. AUGUSTUS ST. GAUDENS, SCULPTOR; —"THE CHALLENGE." MR. CHARLES CARY RUMSEY, SCULPTOR.

THE TRIUMPHAL CAUSEWAY. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS. MR. KARL BITTER, SCULPTOR.

THE "FOUNTAIN OF MAN." MR. CHARLES GRAFLY, SCULPTOR; — THE "FOUNTAIN OF NATURE." MR. GEORGE T. BREWSTER, SCULPTOR.

THE "STRUGGLE FOR EXISTENCE": A FOUNTAIN. MISS ENID YANDELL, SCULPTOR; — TERMES AND ELECTRIC CANDELABRA IN THE SUNKEN GARDEN

A PAVILION OF THE MANUFACTURES BUILDING. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.; —TERRACE OF THE PROPYLÆA. MESSRS. BABB, COOK & WILLARD, ARCHITECTS, NEW YORK, N. Y.

"THE CHARIOT RACE." MR. FREDERIC G. ROTH, SCULPTOR.

BASE OF THE "FOUNTAIN OF NATURE." MR. GEORGE T. BREWSTER, SCULPTOR.

DOORWAYS AT BEAUVAIS AND PROVINS, FRANCE.

TRANSEPT DOOR, CATHEDRAL OF COUTANCES, MANCHE, FRANCE, — CHURCH DOORWAYS, LE-MESNIL-ST.-DENIS, FRANCE.

CHURCH AT BERZY-LE-SEC, NEAR SOISSONS; — CHURCH AT BRAINE, FRANCE.

CHURCH AT FROUVILLE, FRANCE; — ABBAYE DE LA LUZERNE, ST. PIERRE-LANGERS, MANCHE, FRANCE.

CHURCH AT VAILLY, AISNE, FRANCE; — CHURCH AT VASSENY, NEAR SOISSONS, FRANCE.

CANDELABRA, 149 BROADWAY AND 20 BROAD ST., NEW YORK, N. Y.

"THE MEDICINE MAN," PARIS EXPOSITION OF 1900. MR. C. E. DALLIN, SCULPTOR; — COLONNADE OF THE LOUVRE AND FREMIET'S STATUE OF "VELASQUEZ," PARIS, FRANCE.

THE FOUNTAIN OF ST. SULPICE, PARIS, FRANCE. L. T. J. VISCONTI, ARCHITECT; — THE CHAPEL OF THE SORBONNE, PARIS, FRANCE. JACQUES LEMERCIER, ARCHITECT.

NOTES AND CLIPPINGS

WILKINS'S OVERBIG BATTLE-PIECE. — An elephant of a picture is troubling the souls of the Corporation of Hastings-by-the-Sea, England. It is a battle-piece 31 feet 6 inches wide and 17 feet 6 inches high. Painted by Wilkins in 1820, it has never found a wall big enough to contain it, though the Corporation paid $7,500 for it eighty-two years ago. The last suggestion is to offer it to Sir Augustus Webster, the new owner of Battle Abbey, the building erected on the spot where Harold fell to express the gratitude of Duke William for his victory. The moment chosen by Wilkins is the last charge of Duke William, when Harold had fallen by a chance arrow and the Saxons began to flee. — *N. Y. Times.*

THE DOME OF THE PARIS PANTHEON. — The dome of the Panthéon at Paris, beneath which the centenary of Victor Hugo was celebrated, is constructed entirely of stone, and is placed in the centre of a Greek cross. It is supported by four triangular piers strengthened by engaged columns of the Corinthian order. The four piers with the lines of the intermediate arches form externally a large square, each side of which is 74 feet 9 inches. These four piers are pierced above with arched openings, and between the piers with the openings are large arches, the diameter of which is 44 feet 11½ inches, and the height 85 feet 5 inches. Between these arches rise the corbellings, which are gathered in to form the circular plan of the drum. The arches and the corbellings are crowned with a large entablature 13 feet 4 inches high. The upper part of the cornice of the entablature is raised 101 feet above the pavement of the nave. The diameter taken at the frieze is 66 feet. The internal drum which is constructed on this entablature is 55 feet 7½ inches in height to the springing of the internal dome. The interior of this drum is decorated with a continuous stylobate, which is the basement of a colonnade of sixteen Corinthian columns almost isolated from the wall. These columns are 35 feet 2¾ inches in height. Between the columns are sixteen windows; four of which are false, and placed above the four piers of the dome. The colonnade is crowned with an entablature, above which is a large plinth which rises to the springing of the internal dome. The internal dome is 66 feet 8½ inches in diameter at the springing, and is decorated with octagonal caissons or sinkings with a rose in the centre of each. The eye at the top of the dome is 31 feet 3½ inches in diameter. Through this eye is seen the upper part of another or intermediate dome. The external dome is placed on a circular base 108 feet 7½ inches in diameter and square at the bottom. The angles are strengthened by flying-buttresses. Above the corbellings a circular wall is constructed, forming an external continuous stylobate which supports an external colonnade. The external colonnade constructed on the stylobate forms a peristyle round the dome, and is composed of thirty-two isolated columns of the Corinthian order 36 feet 5¾ inches high. This colonnade is divided into four parts by the solid constructions in masonry raised over the four piers. The external colonnade is surmounted with an entablature and balustrade above it. There is an attic constructed above the circular wall of the drum, set back 13 feet 10 inches, and pierced with sixteen windows, twelve of which light the space between the internal dome and the intermediate dome which bears the lantern. This attic is terminated with a cornice with a step or plinth above. The external dome, 77 feet 8¾ inches in diameter, measured on the outside, is constructed with masonry; the height is 45 feet 9½ inches from the top of the attic to the underside of the finishing against which the curve terminates. The outside of the dome is covered with lead, and is equally divided vertically by sixteen projecting ribs. The intermediate dome, built for the purpose of carrying the lantern, was intended to be decorated with subjects by the painter. The form of this dome resembles the small end of an egg; its springing commences at the base of the attic at the point where the internal dome begins to disengage itself. This dome is 50 feet ¾ inch high, 3½ feet and 70 inches in diameter, and is pierced with four great openings at the lower part 37 feet 3 inches high and 30 feet 10½ inches wide at the base. On a circular platform above the summit of the dome are eight piers with arches, which support the finishing against which the external dome terminates. Above this is the lantern of the dome. — *The Architect.*

A DAY'S WORK IN BRITISH BRICKLAYING. — A long letter from Mr. Stewart, the building-manager to the British Westinghouse Electric Co., relating to the number of bricks per day laid by the bricklayers engaged in the erection of the works for that company at Manchester, appeared recently in the *Times*. Replying to the questions, "What is the thickness of the walls? Was mortar or cement used?" Mr. Stewart says that in no instance are the walls less than 19 inches thick, and that in some instances they are 23 inches thick, also that mortar was used, not cement. All the walls are "piers." In the centre of each brick pier is a large "Z" bar steel column. With one exception all the buildings are faced with No. 2 stock-brick. This work may therefore be regarded as closely approximating in character to that performed by the bricklayers employed by the London County Council, but the average number of bricks laid per man per day was 1,400, as against the trade-union standard of 450, or the London County Council average of 330. For "common work" the Westinghouse now averaged 2,250 bricks per man per day. Some explanation of the difference between the speed of British and American work is to be found in the following statement: "Our mortar is made much softer than that commonly used in England, and the bricks are laid by a light pressure of the hand and a light tap of the trowel, instead of by repeated hammering of the trowel to force the brick into place in stiff mortar. By the use of soft mortar we can lay enough mortar with one stretch of the trowel for half a dozen to a dozen bricks." Now, one stretch of the trowel with stiff mortar such as is used here will suffice only for three bricks, and it is evident, therefore, that since each trowel-charge of stiff mortar is of greater weight, and is more difficult to work, than the same charge of sloppy mortar, and will suffice for less than one-half the number of bricks, the weight of mortar and the work expended on a given area of finished brickwork laid on the British system must be much greater than a similar area laid on the American system. For 9-inch walls there is no doubt that the maxim, "Wet bricks and stiff mortar," must be retained, but it is possible that for walls exceeding 18 inches in thickness British builders may without much risk increase the speed of bricklaying by using more water in the mortar. We are of opinion that the use of sloppy mortar in the American fashion produces inferior brickwork to that erected on the British system, though we have never heard that American brickwork is unsafe, and modern factories are seldom required to be durable in the British sense of the term. But even for high-class British work the number of bricks laid per day should not be less than 600. — *The Builder.*

EL CAMINO REAL. — A California association is making an effort for the restoration to usefulness of "El Camino Real," the royal road, or the king's highway, which was travelled by the Franciscan missionary friars in the days, more than a century ago, before the "gringos" invaded the land. This road was the most direct route practicable between the pueblos and the missions. It ran through very many of what are now the counties of the State, and the supervisors in these counties have been asked to aid the movement. Many of them have consented. Little engineering science was used in the layout of the road. It sought a direct route where practicable, but it avoided obstacles, and it would be of little commercial use in these hurrying days. But the presidios, pueblos, and missions are "drawing" objects of interest to the tourists, and it is thought that interest would be increased if opportunity were afforded these later pilgrims to travel from mission to mission over the roads which had been trodden by the sandals of the friars and the boots of the Spanish soldiery. — *N. Y. Evening Post.*

WATER-LEAKAGE IN NEW YORK. — A recent writer in one of the daily papers of New York City ridicules the assertion that about seventy-five per cent of the Croton supply of water "enters the foundation-walls of the buildings along the many miles of mains." He shows that "seventy-five per cent of the daily delivery of New York's water-supply escaping into the ground, as they would have us believe, would play havoc with the streets by washing out the earth and causing the streets to cave in when heavy teams passed over these places." There is waste, of course, but the greatest amount (he insists) is in the older parts of the city. Yet it is these that "the heaviest trucks traverse, and a washout from a large leak would let a truck down." He would not be surprised to learn, however, "after an investigation, that, when the service-pipe is abandoned, the entire line from the buildings to the main, ferrule, or cock, is not removed, but only cut off at the curb line and the pipe hammered together — a custom by no means uncommon with contractors and plumbers — in which case there must be much and constant waste from these abandoned service-pipes." The writer proceeds: "I believe the Water Department had such experience only recently in Hanover Square. As an illustration, take the site of the new Custom-house at Bowling-Green. There once stood forty or fifty separate buildings, with as many service pipes. Have they all been removed all the way out to the street mains, and the taps in the mains plugged? Of course, the new Custom-house is not going to use all of those little fellows, but, no doubt, will make one, or several, new and larger connections." — *Fire and Water.*

APARTMENT-HOUSES NOT TENEMENTS. — The question before Justice Truax, at the Special Term of the Supreme Court, in the case of George Kitching against Kate C. Brown, was whether the defendant had violated a covenant in 1873 not to erect tenement-houses on his premises. Mr. Brown has erected three modern apartment-houses, each seven stories in height and each containing two apartments on a floor. Each suite has a parlor, dining-room, library, kitchen, five bedrooms, and servants' quarters. The buildings have every modern convenience. Justice Truax recently found against the plaintiff's contention that the buildings are tenement-houses, and within the definition of the Act of 1867, where such houses are "taken to mean and include every house, building, or portion thereof which is rented, leased, let, or hired out to be occupied as the home or residence of more than three families living independently of one another and doing their cooking upon the premises, or by more than two families upon a floor so living and cooking, but having a common right to the halls," etc. Justice Truax says the words "tenement-house," as used in the covenant, are to be construed according to their plain, ordinary, and popular sense, and not according to the definition given in the Act of 1867. "A tenement-house, then" (in 1873), continues Justice Truax, "as well as now, had a well-defined meaning. When one says to-day that a person lives in a tenement-house, he does not mean that such person lives in a house like the Nevada flats, and yet those flats are occupied by more than three families living independently of one another and doing their cooking upon the premises." — *N. Y. Times.*

AN ANCIENT TEMPERED COPPER PICKAXE. — An extremely interesting relic of bygone ages has just been dug up on the shore of Lake Gogebic, a few miles east of Ironwood, Mich., by A. C. Hargraves, of that location. It is a pickaxe of tempered copper that had apparently been used in prehistoric times by people dwelling along the lake. The metallic part of the pick is 23 inches long and about half an inch thick. It tapers to a point at either end and is as finely tempered as a piece of tool steel. At the centre is a place where the tool was bound by thongs to a handle of wood. It is so hard that a steel file makes no impression on the copper. The art of tempering the red metal is unknown at the present day. Occasionally tempered copper knives have been dug up in this region, but this is the largest tool ever found.—*Boston Transcript.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, APRIL 12, 1902 No. 1372

CONTENTS

SUMMARY: —

The Attempts to change the New York Tenement-house Law. — The Benefit of Good Tenement-houses to the Social Body Politic. — The Importance of the Enforcement of all Building-laws. — Real Estate Values in New York and Elsewhere. — "The Horgan & Slattery Contracts." — The Abuses of Advertising. — Fall of a Chicago Building. — The Swiss Contribution to Harvard's new Germanic Museum. — The "Incombustible" Nature of Continental Construction. 9

JOURNAL SKETCHES IN CHINA. — I. 11

THE ARCHITECTURAL TREATMENT OF BRIDGES. 14

BUILDING-LEGENDS 15

ILLUSTRATIONS: —

No. 918 West End Ave., New York, N. Y. — Entrance to the Same. — Apartment-house, New York, N. Y. — Design for new City-hall, Newark, N. J. — Plans and Section of the Same.

Public Pumps, Louvain, Belgium. 16

NOTES AND CLIPPINGS. 16

IT is to be hoped that the assaults on the New York tenement-house laws, which are being made before the Legislature with extraordinary persistence and ingenuity, will not succeed, and the influence of all who wish well to their fellow-citizens, as well as of those who look merely to the selfish object of protecting their invested property against the burdens which pauperism and crime impose upon it, should be brought to bear in opposition to the speculators. The present law involves no hardship to any one, since it compels no one to build tenement-houses against his will, providing only that those who choose that form of investment shall conform to certain regulations, necessary for the health and morals of the public. We know from actual statistics that the very poor are more moral than the rich, but their modest virtue cannot be expected to resist the contamination which they have hitherto been unable to avoid, and it is the duty of the community to do what it can to protect them and their children from such contamination by such means as legislation can afford. Among these means, none is so effective as the regulation of tenement-house construction. Every one knows that the habit of poor people, especially those who are poor and young at the same time, of spending their leisure moments in the streets, is ruinous to their morals; yet the alternative, of spending their time in the foul air of their gloomy and unventilated tenements, is something which they can hardly be blamed for rejecting. To induce people to cultivate the virtues of home, their home must be at least tolerably attractive; that is, it must be so well supplied with fresh air and light that their physical natures will not instinctively revolt against it, and so protected against rude intrusion that the members of the family can have at home something of the freedom which they now seek outside. If these requirements are fulfilled, family life among the very poor can easily be made as valuable, as a civilizing agent, as it is among the well-to-do. In fact, very poor people, from the intimacy necessary in their crowded dwellings, and the constant practice of forbearance and self-sacrifice which their circumstances require, often develop a sweetness of disposition, and an intensity of mutual affection, which are rarely seen among the rich; and the work of encouraging this family attachment among the humble, and protecting it from contamination by evil associations, is, perhaps, the most important that philanthropy presents. To a very great extent the happiness and purity of family relations depends upon the planning of the dwellings in which poor people must be crowded together, and legislation which secures the general adoption of at least the simpler principles of good planning is the greatest benefit that can be conferred upon those citizens who have not the means of influencing for themselves the construction of the houses in which they must live.

IT must be remembered that every person, rich or poor, has a special interest in the improvement of tenement-houses. Every happy and contented family is an element of power and prosperity to the whole community, just as every outcast is a burden and a menace to it. Whatever tends to make people happy, by promoting their physical and moral health, and to make them contented, by preserving their strength to work for themselves and each other, adds to the productive resources of the State, and lessens its burdens, and no one can have followed the progress of modern sanitary science without observing the profound change which the spread of cleanliness and decency has effected in nearly every civilized country. Until recently, the beneficent effect of abundant water-service and efficient sewerage have been felt mostly among the middle classes, who have had money enough to provide the plumbing appliances required by the new ideas of decency; and the very poor, who form at once the most numerous class, and the one most in need of sanitation, as well as the least able to obtain it, have been neglected. Now, however, there is a strong tendency toward securing for the poorest people something of the advantages which others find indispensable. The present tenement-house law of New York is a result of this tendency, and to annul or modify essentially any of its important provisions would be to abandon the ground that has been gained.

MORE important, however, than the passage of such laws is their impartial enforcement, and it is this which, if the present law is maintained, must next receive the attention of its friends. A recent examination of the New York theatres, by the new Superintendent of Buildings, has shown that the laws regulating their construction have been, in many instances, shamelessly violated. It is needless to say that if the owner of one theatre can violate the law with impunity, other owners will obey it unwillingly, if at all, and the practice, in such constructions, will soon be simply a struggle to evade it. The summary closing of all theatres in New York which do not comply with the law in every particular would convey a most wholesome lesson to builders and real-estate speculators, and this, followed by a thorough inspection of all new tenement-houses, would not only protect their future occupants, but would encourage the better class of builders and owners, whom nothing disheartens so much, in their conscientious efforts to comply with the law, as the feeling that some competitor in business, with the advantage of corrupt collusion with an inspector, will be enabled to get away their tenants by the offer of rooms, equally attractive with theirs, so far as the tenant can judge, at rents which would not pay reasonable interest on the cost of a house built in compliance with the law.

EXPERT observers in New York think that the great speculation in real-estate, which has so long flourished there, has passed its climax, and that values, in many cases, will soon begin to recede. Such movements in real property are usually started by some important political or other change, and the consolidation of New York with the neighboring cities undoubtedly gave the first impetus to a speculation which has lasted until now. In Chicago, the settlement of the great strike a few months ago seems to have given a similar impetus to real-estate operations, and, according to the accounts, values of real property there, which have remained stationary for nearly ten years, are beginning to advance. Boston is the only large city in which nothing of the kind has yet been observed. With the exception of syndicate transactions in connection with office-buildings, there has for several years been very little movement in real-estate, and prices have, in most cases, declined during that period. Lately, however, rents have, in many cases, been raised, in consequence of a rather marked increase in demand for buildings of various sorts, and the prospect is that large amounts of money will, before long, be taken out of stocks, which pay less than three per cent interest on their present selling value, and put into real-estate of various kinds, the price of which has remained stationary, or has declined, within the last twenty years, while that of personal property has, in many cases, doubled, and which, with rents at present rates, pays easily five or six per cent on the investment. It is not likely that there will be anything like a general speculation in Boston real-estate, unless one should be started by the annexation of the neighboring towns which an energetic party is trying to bring about; but a slow advance in values of land, and an increased demand for store and house property in good locations, seem extremely probable.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

PERCEIVING from the tenor of the remarks we made about their affairs a week or two ago that we had no disposition to give overmuch credence to the justifiability of the indecent newspaper assaults that have for many months been made upon their professional reputations, Messrs. Horgan & Slattery, architects, of New York, took the trouble to bring to us a number of documents that tend to prove that they have not received at the hands of Mayor Low the consideration to which their claims seem to entitle them. The papers they exhibited to us would seem clearly to show that they deserve, at least, a fair hearing, while this Mayor Low has declined to give them, basing his objections, as we understand the situation, on the, to him, evident fraudulent intent or the monumental professional incapacity of architects who prepared plans for an armory building intended to cost four hundred and fifty thousand dollars, the lowest bid upon which was over six hundred thousand dollars. We ourselves, believing the Mayor must be right, agreed that so great a disparity between appropriation and the lowest bid was reason enough for breaking off dealings with architects so incompetent or so untrustworthy. But the documents before us show that, after receiving the instruction of the Armory Board, Messrs. Horgan & Slattery, on December 11, 1900, sent in preliminary drawings accompanied by their approximate estimate of six hundred thousand dollars. Between this time and November 19, 1901, they were in constant communication with the Board of Armory Commissioners, working up their drawings and specifications, without a word of advice that it would be needful to reduce the cost, and on that date the Board voted that the contract with them should be finally executed. Then, two weeks later, when the contract was brought to them for signature they first found out that the actual appropriation was to be much less than six hundred thousand dollars. On this statement of facts it is not surprising that the bids actually received in the following January exceeded the allowable ten per cent of excess to which our remarks referred, and it seems to us that the architects should be given a fair chance to prove their allegations.

WE have no desire to stand sponsors for Messrs. Horgan & Slattery whether as men who have political affiliations of one sort or another, or as architects of undisputed ability, but we do feel that they are entitled to fair play, and the reckless newspaper scribblers have made so much fun out of the sonorous slipperiness of their names that a notoriety has been thrust upon them that could not have befallen, say, Messrs. Green & Brown, no matter what political affiliation the latter might have had. And these newspaper jibes and floutings have been of such a character that reply to them was impossible for men who had any respect for themselves and believed that their real acts and motives fell within the limits of professional propriety. We will say frankly that we share the misgivings of those who have imagination when we consider the possibilities of the interior of the Hall of Records being carried out with the exuberance of effort that is shown in a design published elsewhere in this issue, but that exuberance need not of necessity intervene and it is not impossible that Messrs. Horgan & Slattery already perceive the desirability of associating with themselves — supposing that the contract between them and the city is not to be cancelled — a known, or a nameless, somebody who really does understand the style in which Mr. Thomas was working and the refinement of which it is susceptible. As to the County Court-house matter, to which we also referred, it is to be remarked that judges may know quite as much about law as a Corporation Counsel, and that three of the justices approved of the architects' plans for altering the building and found no reason why the work should not be entrusted to them.

THE Boston *Herald* has done an excellent work in calling attention to Mr. John DeWitt Warner's interesting lecture on the Abuses of Advertising, from which our cities are beginning to suffer greatly. London, where every omnibus is so covered with advertisements that it is difficult to find the inscription showing its destination, and where a patent-medicine vender was recently allowed to cover Nelson's flagship, the "*Foudroyant*," with advertisements of pills, is perhaps the worst existing example of the abuses in question, but New York is now not far behind; and Mr. Warner calls upon all who care for the artistic interest of our cities to unite their influence to secure the regulation of advertising in public places. In France, where every public advertisement must have a revenue stamp on it, proportionate in value to the size of the placard, this tax alone brings in seven hundred thousand dollars a year; yet the tax, on an advertising card of reasonable proportions, is very small, and its effect seems to be to reduce the size of placards, and to promote endeavors to make them artistically attractive, rather than to reduce their number. Naturally, the man whose business will not warrant the expense of buying stamps for very large advertisements is likely to use some thought in the attempt to call public attention to smaller ones, and it has not taken long, in France, to discover that artistic beauty attracts many more readers than the vulgar obtrusiveness of enormous size. As a consequence of this, hundreds of advertising posters are to be seen in France which are models of beautiful coloring and clever treatment of effect; and artists of high reputation are employed to design them. In many cases, the posters are of so much merit that they are sought by collectors, and bring a price, as specimens of artistic workmanship, far beyond their cost. In Switzerland, whether in consequence of a similar law, or through the instinctive decorousness of the Swiss, very beautiful posters are seen everywhere, and the same is the case in Belgium, where public art is an object of exemplary devotion. In this country, where rival magazine covers, and occasional placards, show sufficient ability on the part of designers, the demand of advertisers is generally for something obtrusive and cheap; and it would be well worth while at least for Boston and Cincinnati, the two American cities in which, perhaps, the love of beauty is most generally diffused, to try the French method of regulation, which would at least pay for itself, and could do no harm, while it might do much good.

A BUILDING fell the other day in Chicago through the effect, as we are told by the daily papers, of "frost leaving the ground." That this reprehensible conduct on the part of the frost was the sole cause of the catastrophe is made certain by the fact that the structure was begun in December, the foundation being laid, apparently, on frozen ground, and everything remained firm until the ground was "softened" by warm weather. Then the foundations settled, and the building fell. It may be remarked that experienced architects, in Chicago as well as elsewhere, have long been acquainted with the fact that this result usually follows the "softening" of the ground under foundations laid on frozen soil; and, as there seems to be no way of preventing the frost from "leaving the ground," they take the precaution to lay the foundations of their buildings on unfrozen ground, by digging down through the frozen crust, if necessary, and bank up with earth around them in winter, to prevent the ground from freezing under them after they are laid. Warm weather, naturally, does not affect foundations laid in this way, and the method may be commended to the attention of architects and others who suppose that frozen soil is a proper material to rest a building on.

THE new Germanic Museum of Harvard University, which begins its career with a magnificent collection of casts of German works of art, presented by the Emperor of Germany, is to be still further enriched by the gift from the Federal Government of Switzerland of a set of casts of Swiss art, mainly taken from objects or casts in the National Museum at Zurich. It is hardly necessary to say that Switzerland contains many precious bits of architecture and sculpture, which will add greatly to the interest of the collection in the Museum; and the thoughtful courtesy of the Swiss Government in making the gift will be nowhere more highly appreciated than in Harvard University.

THE people who are always holding American architects up to scorn for their ignorance of the "solid" and "incombustible" nature of Continental construction might with advantage be occasionally reminded of the great fires which occur in European cities. One of the most destructive of these, about which little is known in this country, was that in the Antwerp bonded warehouses, last year, in which several connected buildings, filled with goods, were completely destroyed in less than four hours, with a loss of about thirty million dollars. The buildings were old, and made no pretence of fireproof construction, although the timbering was heavy, some of the beams, which were completely burned through, being a foot square in section; but the difference between the rapidity with which the fire actually ran through and destroyed them, and the behavior which newspaper correspondents usually attribute to all Continental constructions in such cases, is interesting to note.

JOURNAL SKETCHES IN CHINA. — I.

WITHIN 100 miles of the mouth of the Yangtse the sea becomes yellow and the water opaque from the mass of mud brought down by this great river. The Yellow Sea, the name of which I had learned in my early school-days, was now clearly understood, so much better is a single object-lesson than pages of dull description. With the understanding of this came also a realization of the mighty changes which are slowly taking place in the wearing away of land-surfaces and the filling-up of sea-bottoms through the erosive energy of water. Here was this great mass of water, 100 miles from land, made noticeably yellow by the mixture of fine sediment brought down by the river. I could not help reflecting that if, in the future, a yellow flood of human detritus should overrun Europe and America it would render civilization just as opaque and make shallow the great depths which mark the intellectual supremacy of our race to-day.

We anchored at midnight some miles within the mouth of the river and at dawn started again, still, apparently, in mid-ocean, as no land could be seen on either side. The river at this point is 40 miles wide, and one realizes its magnitude when he is told that for 800 miles the river is deep enough to float the largest ships. We sailed for an hour and more and the expanse of water seemed illimitable. Gradually we neared the southern shore, and long, low stretches of land came in sight. The scene was desolate to the last degree. The vessels we passed were numerous and quaint; we had seen such craft figured in books and were familiar with their models in the museum at Salem, but here were the veritable objects: fishing-boats, trading-vessels, engaged in the enormous coast-wise traffic, and war-junks. The fishing-boats had a huge dipping-net standing up like a sail on either side of the boat, and not on one side, as I had noticed in Japan.

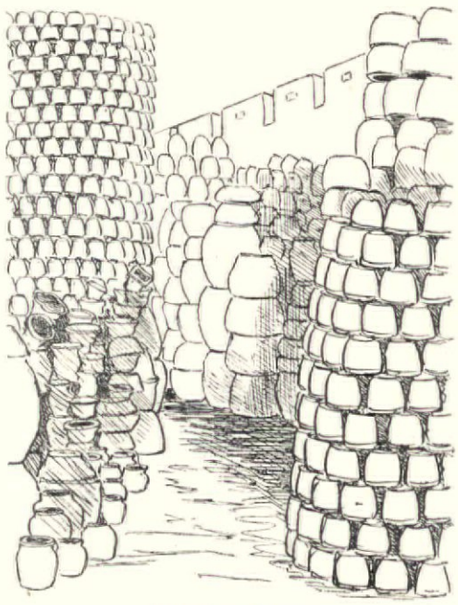
My attention was soon attracted to the peculiar features of the land, which was covered, so far as the eye could reach, with low mounds. It presented the appearance of a salt-marsh covered with hay-cocks. My first impression was that they were prehistoric mounds, and consequently offered a great field for the archæologist. I soon learned that these mounds, extending to the very horizon, were simply ancestral tombs, or burial places. Here, then, we had, even before landing, a glimpse of how a baleful superstition could arrest the progress and development of a people. Not only was a vast amount of arable land thrown forever out of cultivation by these surface-consuming sepulchres, but the necromancers insist that no road shall be built through them, nor must the shadow of a telegraph pole or wire fall upon them. One no longer wonders that there are so few roads in China. Some slight respect might be felt for this superstition if these mounds showed any evidences of tender regard or care for the dead. A closer examination, however, shows them to be in the most neglected and dilapidated condition. The contrast between their treatment and the treatment of similar places in Japan, where graves 300 years old even are still freshly decorated with flowers, is striking.

After sailing for several hours, entertained by the diversified craft on the water and depressed by the dismal and monotonous landscape beyond, we turned into the Shanghai River, and, crossing the bar, after another hour's sail, reached Shanghai and came to anchor. I noticed the little boats as they came out or floated by were brown with dirt and grease; indeed, the woodwork reminded one of the inside of a hut for smoking bacon. My standards of comparison were always with Japan, and this was certainly unfair, but there came to me the memory of Japan, where the woodwork of boats recalled the cleanliness of a Quaker kitchen and even the sewage-buckets came back from the country scoured like milk-churns. The memory of Japanese cleanliness rendered all the more shocking the exceeding dirt of this people. The foreign city of Shanghai, with its beautiful buildings, fine streets and parks, has often been described, and the contrast, as one passes from its spacious avenues to the dirt and squalor of the Chinese quarter, is appalling. It is difficult

Gateway, Native City of Shanghai.

to realize that this great object-lesson of order, elegance, cleanliness and comfort is looked upon by the Chinese with supreme contempt.

When I looked out of my hotel window the next morning a glimpse of one form of Chinese architecture was in view just across the street. It was a typical doorway of a business enclosure, and a sketch of one is a sketch of all. The various mouldings and the ornaments over the doorway were very elaborate, and nothing short of a painstaking drawing or photograph could do justice to the work. The little groups of carved human figures and pheasants, brightly colored, and tinsel-like accessories, might have meant something to the Chinese brain, but they looked trivial and insecure for



Pottery Yard, Shanghai.

the entablature of a doorway. Whole streets in the foreign quarter are lined with these rather high, windowless walls. Some of them had stone or glazed pottery panels with figures of flowers moulded in high-relief. The ridges of these walls were gracefully turned in broad curves, and imbricated coping of roofing-tiles, bedded in cement, presented features that our architects might study with profit.

After breakfast I hunted up Mr. Edward B. Drew, an officer in the Chinese custom-service to whom I had a letter and who during my short stay in Shanghai greatly facilitated my work. His father kindly offered to go with me to the native city of Shanghai. It should be explained here that the Chinese towns are surrounded by high walls having several gates which are closed at night. The irregular lanes which function as streets, the filth and noise of these overcrowded communities are intolerable to our race, and one, therefore, finds at Shanghai, Canton, Tientsin and other cities a concession where the foreigner lives apart, with his own ideas of streets, buildings and cleanliness. This, then, was the foreign city of Shanghai with its imposing buildings; villas with well-kept lawns and gardens; broad avenues and open parks modelled after our own ways and presenting the leading characteristics of our well-ordered cities. The dwellings, with their open character and their broad verandas, have just enough flavor of native architecture to add piquancy to the effect, and the Chinese nurses, with strange coiffures and silken garments of curious fashion, accompanying little English boys and girls, present a continual series of interesting sights to the foreigner when he first lands. Then in contrast is the ancient walled city of Shanghai, out of whose dungeon-like gates swarm a living stream of natives, reminding one of a colossal ants' nest. As we neared the city the swarm and bustle increased — an eager, active crowd, pushing, jostling, shouting and intent on getting somewhere with their multifarious loads swinging from the ends of their carrying-poles, which they deftly guided through this dense current of humanity.

The grim walls of the city towered just beyond a bridge which spanned a narrow canal filled with all manner of liquid impurities. The walls were crenellated for cannon, but no cannon could be seen, and with their massive thickness and rounded buttresses they presented a most formidable appearance. Outside the wall were piled to a great height pottery jars of all descriptions. It was a veritable lumber-yard of pottery. There must have been thousands of pots and jars in these accumulations. They were piled up in regular and solid masses nearly to the height of the city's walls, — huge water-jars, bathing-tubs, flower-pots, etc., all of coarse pottery with brown or green glaze. One wondered if they ever tumbled down, and wondered still more how they had been piled up to such a height and so securely.

As we entered the city the crowd became denser and such a swarm of shabbily dressed men and boys I never saw before. Now and then a mandarin with his brocade and silken vestments rendered more striking by contrast the squalor of this unkempt crowd. A few women and children were being hustled in this living stream which incessantly flowed in and out of the gateway. We passed through by dint of much dodging and became one with the innumerable mass that filled the irregular-running streets. Palanquins, each with a number of bearers swinging along and crowding obstructors to the wall; peasants with buckets hanging from the ends of long

carrying-poles containing the sewage of the city, rudely sweeping by, shouting and by no means careful whether they brushed you with their filthy receptacles or not; water-carriers moving rapidly along with slouching step in cadence with the oscillations of their carrying-poles, their legs fairly buckling under them from the enormous weight they were bearing, and calling out in curious cries to make a way; wheelbarrows loaded with market produce and human freight as well, awkwardly jamming into the crowd, all combined, made an impression never to be effaced. Everybody was dirty, and the surroundings were dirty and old. The city looked as though it had never been swept or cleaned, and it never had. Mediæval microbes and prehistoric odors were always in evidence; many buildings going to ruin and, apparently, nobody with time or interest enough to arrest the decay. Indeed, in my brief experience in China, I do not recall the sight of any one repairing or cleaning a building.

The street sights, as in all Oriental cities, were of abounding interest. Here was a group of little boys gambling with copper cash and wildly and noisily gesticulating. The Chinese are born gamblers and their various methods and intricate games of chance render poker, to them, a kindergarten game. In a little open space, wet and muddy, was a wreck of a street juggler, ragged and dirty to the last but one degree, with an assistant reaching the last degree of dirt and dilapidation. The properties with which they played were equally squalid — a basket, a rag, a wooden doll, a cup, a few bamboo tubes and other junk-shop material. Now, the marvel was to see these vagabonds, with vagabond material, play the most wonderful sleight-of-hand tricks. After seeing these wrecks perform, I could well believe some of the marvellous stories about the Indian jugglers. A circle of admiring men and boys surrounded them, and despite the danger of contagion, for at that time the people were dying by hundreds of small-pox and one passed on the street cases showing full efflorescence, I joined the ring. The ancient trick of sword-swallowing was done with a long rusty sword and there was no trick about it, for the rusty blade was literally thrust down the stomach. The man had picked me out as a victim and with body inclined and straightened he came directly to me and held out his hand, nor would he draw the sword till I had given him some money, the crowd, meanwhile, eyeing me and derisively shouting. When he withdrew the sword tears flowed from his eyes and copious phlegm ran from his mouth. It was a most painful and disgusting sight.

Our guide was to take us to a famous tea-house, and the remembrance of the Japanese tea-house, with its exquisite neatness, simple and satisfying surroundings and quiet demeanor of the attendants — all girls — was fresh in my mind, so I looked forward with interest to the sight of a Chinese tea-house and a famous one at that. I felt assured that here, at least, were to be seen some attractive features in the way of cleanliness and pleasant surroundings — some contrast to the squalor through which we had been roaming during the morning. I fully expected to have a new experience, and here was the tea-house: a two-storied building in typical Chinese style, certainly quaint in its architecture and recalling the pictures one sees rudely depicted on blue-and-white china. The building rose from the centre of a pond and was approached by a zigzag bridge. Now, the house, bridge and pond were in an equally dirty condition. The water was covered with a green slime and emitted foul odors. We crossed the bridge, entered the building and found our way to the second story. Taking a seat at one of the tables we ordered the usual tea, which was brought to us, by a male attendant, in large covered porcelain cups accompanied by a tray full of unsavory looking cakes. If there is one evidence above another of the absence of all artistic tastes among the masses in China the appearance of the food alone might be offered.

In Japan the little street booths exhibit a variety of cake, rice-balls with fish on top, and confectionery, and these are all made in tasteful forms and moulds. The Japanese not only enjoy the simple art displayed in all such matters, but seem capable everywhere of fabricating tasteful-looking objects. The Chinese tea was delicious, far more to the foreigner's taste than is the best of the Japanese. At a table near us were three mandarins and, judging by their fine clothing, evidently of the better class. They looked at us inquiringly for a while and finally one of them arose, crossed to our table and shook hands with Mr. Drew, who thereupon presented him to me as one of the famous class of Hartford students who were all recalled by the Government while in the midst of their studies. The two others then came to our table and an interchange of introduction followed. Mr. Drew explained to them my desire to see the interior of a Chinese house, and one of them, turning to me, said that he and his companions had all been so kindly treated in America when students at Hartford that they would be only too pleased if they could be of any service to me. Gladly accepting their kind offers as hosts and guides, I promptly dismissed my guide who had brought me hither, and under their lead at once started off on a round of investigation. It was a rare and interesting experience to ransack the native city with three mandarins dressed, of course, in their full Chinese costume, with their long queues hanging down behind. All of them spoke English without an accent; they were even familiar with our peculiar New England idioms and even with our slang. As an illustration: I stopped to buy some trifle at a shop, when one of them said, "Oh, come along, Mr. Morse, don't bother with him, the fellow's giving you taffy." It was, indeed, a rare opportunity and it was through their help that I was enabled to make many sketches of house-interiors. One of them kindly invited me to his home. How he ever found his way there is a mystery to me to this day. It was a long walk through a tangled labyrinth of narrow and exceedingly crooked streets. On entering his house we apparently passed through the side of a shop and came to an open courtyard. From there we passed into a kind of reception-hall used by two families in common. A side entrance from this led us into a more secluded reception-hall. His little sister came out to meet us and I held her for a moment, but she seemed very shy, as well she might, for she had never been so near a "foreign devil" before. A little brother, equally shy, stayed by me for awhile despite his fears. I was shown rapidly through the ground-floor of the house, including the kitchen and servants' quarters, but, as my friend had invited me to dinner the following day, made only brief memoranda of the points that had interested me. The most serious matter was the very primitive and objectionable feature connected with the sanitary arrangements. I have dealt with this subject elsewhere,[1] but must insist that in these respects the Chinese are degraded to the last degree and one wonders, if such conditions prevail throughout the Empire, how the nation should number 400,000,000, whereas if they belonged to the same species with ourselves they should all have been swept off the face of the earth centuries ago. Entering a room called the study, or library, we were invited to sit; a servant brought us a light refreshment consisting of fried peanuts, oranges and a little root which had a delicious crisp taste. The root was dug from the river-mud and was quite new to me. I enjoyed it, not having seen the river. Wondering how I should dispose of my orange-peel and peanut-shells, I was told to throw them on the floor! The floor, it may be added, was apparently mother earth — damp, cold and nearly black in color; in fact, a continuation of the street-surface. Doubtless, the floor was tiled; the dirt, however, obscured all traces of it. It was late in the afternoon when my companions guided me to the gate of the city by which we had entered in the morning. After passing through a densely settled Chinese area and coming into wide streets and fresh air it was like passing out of a noisome pit into health-giving daylight. Outside the city-walls there is an immense Chinese population, outnumbering the foreigners thirty to one.

The next morning, one of my Chinese acquaintances of the day before came to the hotel to guide me again through the entangled channels of the native city and to take me to his house to dinner instead of to the house where I was first invited. We entered by a different gate, yet the same throng of people were pouring in and out, and the walls about the gate had the same huge piles of pottery in great blocks. We traversed the same narrow and tortuous alleys, were assailed with the same odors and hustled by the same rude hurrying crowd of water-bearers, sewage-luggers, market-men and a hundred other varieties of two legged carriers. It was a puzzle as to what they were all about and why they were in such haste. In the toting of heavy loads one might imagine the hurry to get rid of the swinging weight, but everybody seemed to be impelled by a restless or nervous energy, and yet no race shows more the absence of what we call restlessness or nervousness than the Chinese.

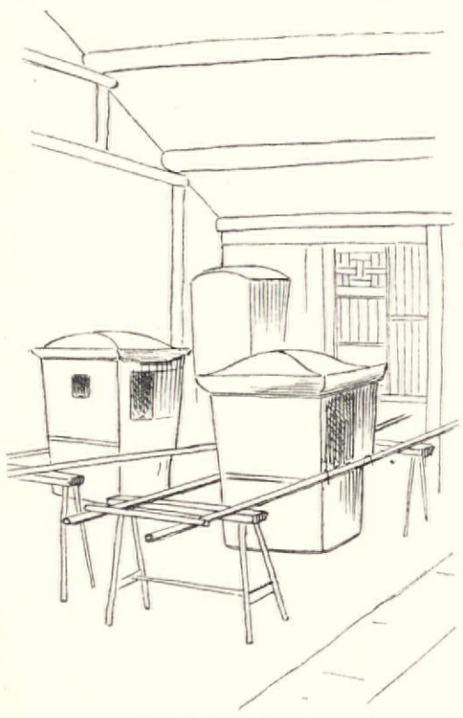
A second view of the city opened new sights. A peculiar effect is produced by the shop-signs, which are hung at right angles from the shops and when free hang vertically, as the Chinese characters are read in vertical lines. These signs were of all sizes and the characters were in gilt or red. Over the door and on the sides of the posts were strips of paper upon which characters were written.

The narrow streets curving often and the projecting signs, with the close crowds filling the entire thoroughfare from side to side, give one a smothered sensation. From the open character of the shop-front and the many occupations going on in the street one is brought into most intimate contact with the people. Porcelain-shops and metal-shops seem to predominate, probably on account of the cleanliness of the "blue and white," and the hammering noise emitted by shops of the other kind. Restaurants were numerous, but the unsavory messes offended the eye as well as the nose. On our way to the house where we were to dine we stopped at a few Buddhist temples, and these were so dirty and dilapidated that any description of their lamentable condition would seem exaggerated. It was shocking to see the root of a tree prying off some delicate bit of stone carving from an entablature and no one in the land with wit or enterprise enough to cut off the offending root and save the structure. We stopped at one house to invite a companion of the day before to dine with us. He was still abed, though it was past ten o'clock, and so, while waiting, I had an opportunity to see a coffin-maker's place, for that was the trade of his family. Whether the occupation of coffin-making is considered respectable in China I do not know, but a friend of mine, whose family name is Coffin, on being presented to our Chinese minister, Mr. Wu, brought out the brusque response that he ought not to have such a name. I examined the stock-in-trade. The coffins were huge affairs, the best ones being made of thick planks. In these chests the body is closely packed with powdered charcoal and may be kept in the house for weeks before final interment. In passing some carpenters at work I noticed that many of the tools were identical in form to those used by the Japanese; the wood-lathe was used in the same way; the blacksmith's bellows, in the form of a large square box with a square piston working back and forth, was the same. The blacksmith, however, stood at his work and the anvil was raised from the ground. In Japan the blacksmith sits on the ground and may be seen pulling the bellows with one foot, while the other foot is bent under him, the anvil being on a level with the ground, the helper, however, standing at his work.

[1] "Latrines of the East." *American Architect*, March 18, 1893.

China, I soon realized, was a land of tables, chairs and bedsteads, and men stand at their work. Their legs are long and well formed, and the Manchus, as a class, are physically well built. It is a common impression with many that the short and often bent legs of the Japanese are due to their custom of sitting for many hours at their work with their legs bent under them. If it could be proved that the shortness of their legs was due to this universal custom of sitting, which I do not believe, here would be a good example of the transmission of acquired traits.

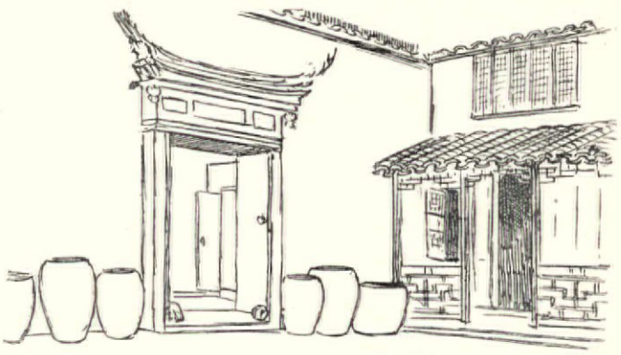
As we approached the place where we were to dine I was told, on inquiry, that the house represented a dwelling of the better class. I asked my host if there were any streets or regions in the city specially noted for their finer houses, and he said, "No; you will find the house of a rich man adjacent to the hovel of the poor." In other words, there is no West End or Fifth Avenue, so to speak. This condition was precisely what I found in the cities of Japan. The entrance to the house was not unlike the one we visited the day before. We first entered an open court surrounded by a high brick wall, which, in turn, opened into an inner court, on our way passing a large room in which were a few palanquins, or chairs, as the foreigners call them — a carriage-house, in fact. In entering the inner court-yard we could look into the general reception-room directly opposite the main entrance. On the sides of this courtyard were rooms which were designed as studies, or libraries. A tiled roof supported by upright posts projected from the eaves, and had there been a floor beneath, a veranda would have been provided for these various rooms. The courtyard was paved with square stones and was fairly clean. The main entrance to the courtyard had an elaborate entablature, too intricate for me to sketch in the limited time at my disposal. At night all the doors are closed and barred, and this feature, with the high surrounding walls of brick, presented a marked contrast to the unprotected and open character of the Japanese house. On either side of the courtyard entrance were huge pottery jars for the purpose of holding water. From the courtyard we entered the library, and here the family immediately gathered about me, all except a daughter, aged seventeen, who was as much a prisoner as any felon. Later I was shown through the house, and having seen several rooms on the ground-floor, I asked particularly to see the girl's bed-chamber, which was in the second story. The appearance of my own daughter's chamber was recalled, with its pictures and souvenirs on the wall and the dainty trifles which brought up so many pleasant memories of parties, picnics and journeys abroad. My host regretfully told me that it was impossible to grant this reasonable request; if I were allowed even a glimpse of his sister's chamber it might be reported by the servants and her chance of marriage might be imperilled. He further told me that even the lower classes were particular in these matters. Even the most intimate friend of the family would not be allowed to go upstairs. Until this experience I never fully realized the condition of women of the more favored classes in China, though their unhappy



Palanquin House, Shanghai.

lot has been repeatedly described in works on the subject. At the outset the girls' feet are compressed in a cruel fashion, so that a dull pain is endured for a year or two, and in some instances mortification of the parts takes place and the child dies; with no recourse to books, as she is unable to read or write; at the age of twelve or thirteen immured in the house like a prisoner, with the privilege, however, of an occasional visit to some intimate female friend of the family or a near relative and this visit made in a closed palanquin; at marriageable age compelled to unite with a man she has never seen and knows nothing about and consequently with no choice in the matter. All of which you say is barbarous, and so do I. This, however, has been the custom for centuries and a custom in China is a thousand times more unmodifiable than with us.

Bearing in mind this custom of rigid exclusion of the women from every walk of life for ages, let us try faintly to imagine how to them



Courtyard: Private House, Shanghai.

must appear an aggressive female missionary boldly walking the streets in open daylight in a garb which seems highly disreputable, not to say indecent, to the Chinese, and endeavoring, in very deficient lingo, to induce the people to come to her compound and listen to teachings as alien to Chinese beliefs, crowded as they are with superstitions, as are the teachings of Ingersoll to the strictest Presbyterian doctrine. I could not help picturing what the effect on our people would be with the conditions reversed, and if a strange and powerful people by armed force should impose upon us a treaty in which had been surreptitiously inserted a clause whereby their missionaries might own property and preach their dogmas throughout our country. Furthermore, for just comparison, the female proselytes of this cult should be seen in our streets with painted cheeks, dyed hair and garments extremely short at either extremity, and riding savagely down the street on a bicycle. Whatever horrid lie might be told about such people would certainly be believed by our masses, just as the shocking lies told about our missionaries are fully believed in China. It can be stated, without a shadow of doubt, that our female missionaries present quite as shocking a sight to the Chinese as would be to us the apparition I have just described. Now, we all know and admire the heroism which prompts our women to part from family and friends and enter into the arduous work of "converting the heathen." In their work of introducing a new religion, the propriety of which many question, they teach them the laws of hygiene, proper medical practice, the virtue of telling the truth, of being prompt, and set before them the living example of self-sacrifice and devotion for the good of others, and yet these Chinese savages have brutally undone all these workers have accomplished, not only by murdering the missionaries, but by slaughtering the native converts by thousands. It is a pitiful tragedy, and yet, judging from the outbreaks within a year in New York, Ohio and Louisiana, just such tragedies would be possible in our blessed land, if the conditions were reversed.

One of the reasons why the Catholic Church attains greater success than the Protestants in China is that its missionaries are men, its preachers are men, the Jesuit dresses in Chinese garb, he lives among them and becomes one of them; he is careful not to interfere with their superstitions only so far as these interfere with his own, and is especially careful not to inveigh against the foot-crushing mutilation. His incense-burning, bead-counting and picturesque ritual does not widely differ from the Buddhist. Kaempfer, when he went to Japan, as surgeon to the Dutch in Nagasaki, on seeing Buddhistic worship for the first time insisted that it was the devil simulating Christ. "*Diablo simulante Christum.*" Whatever the cause, the results attained by the Catholic missionaries far outstrip those of their Protestant — I was about to say brethren, but there is no brotherhood between these two great branches of Christianity. Not only are the intelligent Chinese perplexed at the variety of creeds presented by the Protestants, but they cannot in the least understand why the French should insist upon forcing the Jesuits into China, having kicked them out of their own country.

EDWARD S. MORSE.

[To be continued.]

LIGHTING THE PYRAMIDS BY ELECTRICITY. — The Egyptian pyramids are soon to come out of their darkness of 5,000 years, and will be accessible to all tourists. General Director Maspero, of the society which has in charge the preservation of the antiquities of the country, has been experimenting with the electric-light, and began his work on the Temple of Karnak, at Thebes. The experiment met with so much approval that he has decided to light the inner passages and catacombs of the great pyramids. This will provide Egyptian tourists with new attractions, and they will be able to penetrate to the innermost recesses of the pyramids. The lighting will be of especial value to women, who have confined their investigations of the pyramids of the left shore of the Nile to climbing up on the outside, as they were afraid of the intense darkness within. With the introduction of the electric-light the tombs of the Pharaohs will be accessible to all. — *N. Y. Evening Post.*

THE ARCHITECTURAL TREATMENT OF BRIDGES.

AS we have within recent months published a considerable number of photographic views of bridges that had been more or less successfully handled from the standpoint of artistic design, our readers may welcome an account, presented by the *Builder*, of a lecture given by H. H. Statham at Carpenters' Hall, London, on "The Architectural Treatment of Bridges."

"He characterized the subject as being essentially a modern one, as until recently bridges had been regarded as purely utilitarian structures; even the mediæval bridges which we have regarded as picturesque were, to the men who built them, only the best practical method of building according to their knowledge and requirements. Recently there had arisen a perception that a large bridge in a city might be an important addition to the architectural character of the city. A solidly-built arched stone bridge was in itself a structure naturally beautiful: it was only when we began to "ornament" it that we might run the risk of spoiling it. The old-fashioned bridges with narrow spans and semicircular arches were the most picturesque; but the demand for larger spans as our traffic grew more crowded and river-craft increased in size rendered it no longer possible to build bridges in this form, and led not only to wider arches, but to the introduction of steel spans, either with stone or steel piers. Steel bridges were a practical improvement in facilitating the combination of wide spans with low gradients; but owing to their thin lines, they could never have the grand and monumental effect of a stone bridge, and they had the additional disadvantage of requiring constant painting, with all which they could not have as long a life as a granite arch. Then there were railway-bridges, which were a separate problem, having to be constructed to fulfil special conditions in carrying heavy loads moving at great speed; so that structures which were satisfactory for ordinary roadways would not suffice for railways.

"Bridges might be classed under three heads: (1) Stone arched bridges; (2) steel spans with stone piers; (3) steel spans with steel piers. We might add a fourth class, now supposed to be rather *passé*, viz, wooden bridges. These, like the stone arched bridge, were almost invariably picturesque from the very nature of their construction, as was shown in the instance of one of the timber viaducts originally built on the Great Western Railway; but for railways they had not the quality of stability and permanence, besides offering danger from fire, and it could not be supposed that any such viaducts would in future be erected on English railway-lines. But for small bridges in country places timber was still a suitable material; such bridges also harmonized with the landscape; and it was much to be regretted that some of these picturesque and perfectly adequate wooden bridges on the upper Thames were being removed and replaced by iron ones, which might or might not have a longer life, but which were certainly not such agreeable or suitable objects in a rural landscape. Steel bridges on a large scale might be classified under the heads of beam bridges (or what engineers would call "girder bridges "), suspension-bridges and trussed bridges. He used the term "beam bridges," because such bridges were merely the application of the beam system of bridging an opening; laying a rigid beam across which bore vertically on the two points of support. A lattice-girder was, no doubt, a trussed construction within its bounding lines, but regarded as a whole it was a beam; it acted as a beam; and it was, or ought to be, no more offensive to taste than a wooden beam performing a similar office. The Britannia tube bridge, in another form, was a typical beam bridge; and, with its massive and simply treated towers, was a fine object. Suspension-bridges, like stone arched bridges, had the advantage of being almost necessarily beautiful in themselves, if let well alone. There was always beauty where a structure expressed, as it were, the forces of nature, whether in the balanced curve of the arch or the catenary curve of the suspension-chain. The practical drawback to suspension-bridges, for heavy traffic, was, of course, their lack of rigidity. Of what might be called trussed bridges the most important form nowadays was the cantilever bridge, of which the Forth Bridge was the most remarkable example, and by means of which greater widths had been bridged than had ever been attempted before. (The principle of the cantilever bridge, with its two arms and the straight length between, was illustrated by the photograph of two men seated in chairs and supporting a third man in the air between them, a whimsical but apt illustration originally made under Sir Benjamin Baker's direction.) The cantilever principle, though only recently used on a large scale by engineers, seemed, however, to be a method that had recommended itself to uncivilized man, as was shown by photographs of a rude Chinese bridge and another made by North-American Indians, both of which were cantilever bridges in a crude form.

"Of all these classes of steel bridges it might be said generally that the less attempt at ornament on them the better. It was very difficult to put any ornament on a steel bridge which would not have a more or less gewgaw effect; the undisguised structure was far better and more sensible. *Pure structure was never in bad taste;* and the anathemas often made against every kind of engineers' steel bridge by æsthetic persons were very absurd. If the objectors knew a little more about structure they would find the steel structure in itself interesting, instead of regarding it as an abomination. Unfortunately, the engineers were going rather in the wrong direction; they were spoiling this class of bridge by attempted ornament. Taking suspension-bridges for instance, it would be seen from the illustrations how extremely simple were the Menai Bridge, the old Hungerford Bridge (now at Clifton), and the old Hammersmith Bridge; while in the new Hammersmith Bridge they had gigantic cast-iron foliage ornament of the most hideous kind, and such as would be enough to vulgarize any structure. Contrast with such a work the Auteuil Bridge at Paris, with its plain structure in the spandrels, a little graceful ornamental treatment in the balustrade (where it was quite in place), and the fine stone sculptured figures on the piers, modelled by some of the first French sculptors of the day. Was not the contrast rather a humiliating one for London?

"The Tower Bridge was referred to as one which was a combination of suspension-bridge, beam bridge, and lifting bridge. It was an unfortunate mistake to suppose that because it was near the Tower it was to be mediævalized. The way to harmonize with mediæval structures was to do as the mediæval builders did — build in the best way known and practised at the time. A steel structure honestly shown would have been far more in harmony with the Tower, in the true sense, than a piece of sham mediævalism. The first design for the Tower Bridge, however, by the late Sir Horace Jones (a view of which was shown) was much better than the one actually built, as it was simpler and more massive in effect, and the towers were genuine solid stone structures. Even in this design, however, there was a want of simplicity, the towers being weakened in effect by unnecessary decorative windows and other details. In the actual bridge these defects were much increased, but the greatest mistake of all was that these apparently massive towers were a complete sham, with no foundation at all, the walls being carried on steel girders; and before the bridge was completed for opening he (the lecturer) had looked under the walls of the towers, which stood over empty space. It was perhaps the most glaring instance of sham in building that had ever been seen. A sketch was shown on the screen to illustrate how such a bridge might be built so as to be a solid and genuine structure, the horizontal girders carrying the tie which connected the suspension-chains being laid on the top of massive towers of stone brought out on each side as buttresses, and the ends of the horizontal members, resting on roller-beds brought out to the front of the buttresses, so that it could really be *seen* what the suspension-chains were attached to, instead of leading them through openings in the masonry as if they rested on it. The mechanism for raising the bascule leaves of the bridge, of which a section was shown, was a beautiful and simple contrivance which could not be too much praised; as an engineering structure the bridge was a splendid success; as an architectural design it was a flagrant piece of pretence. Even in regard to plain steel construction, there was such a thing as good and bad design. Contrast the elevation of the Sukkur Bridge, in which there seemed to be no ruling element of line or disposition, as if the girders were tumbled together, with that of the Forth Bridge, which, by comparison, was a quite Classical design in its symmetry and unity of effect. Coming to stone bridges, they had to consider several points — the form of the arch, the treatment of the spandrel, the treatment of the piers. Semicircular arches were out of the question in these days of wide spans; they had to choose between the elliptical and the segmental form. The former looked best, as it rose tangentially from the pier-surface, while the segmental arch was butted against it, and the elliptical arch gave more height close to the pier; on the other hand, it was flatter at the crown than a segmental arch of the same span, and for a large span required, therefore, very careful building. The voussoirs might either be treated on the same plane with the masonry of the haunches, as in London Bridge (which had a very fine solid effect), or they might be accentuated so as to leave a defined spandrel. Such a spandrel, however, should never be panelled, as at Grosvenor Bridge, Chester; that was a treatment for carpentry, not for masonry. The treatment of the soffit with groins, as in many mediæval bridges, was very effective for bridges on a moderate scale; but for bridges on a large scale there was perhaps nothing so fine as the sweep of the plain unbroken soffit. The projection of the piers, although there had been a kind of traditional notion since Renaissance times of decorating it with a columnar order, ought rather to be treated as a buttress. The raking lines of the balustrade and cornice should be stopped against the pier, not carried round it; the pier was a vertical abutment to them, and not any part of them. The old mediæval treatment of the buttresses as pointed to divide the current produced in itself a picturesque effect founded on practical requirements; but except in a tidal river this treatment should only be strongly accentuated on the up-stream face of the bridge. Character was given by thus suiting the build of the bridge to the run of the water, as was shown in the grand effect of the St. Lawrence Bridge, with its immense up-stream buttresses to break up the floating ice. Waterloo Bridge was an exceptional example in which the Classic cornice was excusably used, because the whole bridge was entirely level from end to end. In London Bridge, where there was a gradient, Rennie, with true instinct, discarded the cornice, and only used a small corbel table. The new Putney Bridge was a very good example, in the same school, of a granite bridge simply and plainly treated, with no adventitious ornament. Reference was then made to Blackfriars Bridge, and to the unfortunate design of the piers as stumpy granite columns of immense thickness, which could have carried a tower over them, and had nothing to carry but a balcony. These columns, like Alexander the Coppersmith, had "wrought us much evil," for engineers seemed to be so much enamored of the effect that the first design for the new Vauxhall Bridge was almost an exact imitation of Blackfriars Bridge. The Institute of Architects had begged for a granite bridge instead of a steel

one of this design; it was replied that the demands of the various authorities in regard to width of span and gradient rendered a granite arch impossible. Eventually a compromise had been come to by adopting a concrete arch with granite facings. The concrete arch itself was an admirable piece of construction on a somewhat novel principle; a section of it was shown and described; but in the so-called architectural treatment the influence of the Blackfriars stump-column still prevailed, and the pier was treated with an enormous half-round column which had nothing to carry but a lamp-standard, and this again had to be made far larger than necessary in order to appear to provide something for the column to carry. The whole thing was so completely out of scale that though the actual height was about 70 feet from the water-line to the top of the lamp-column, any architect would suppose from the scale of the drawing that it represented a structure about 30 feet high. Then a heavy cornice of supposed Classic style was used below the parapet and carried round the column on a raking line; an arrangement which could not be carried out except by "fudging" the mouldings at their mitre junctions; and another effect of this deep cornice was to leave so little depth for the centre voussoir as to make the centre part of the arch hopelessly weak in appearance. A design by the lecturer was shown in which, on the same constructional lines, the pier was treated in a buttress form; and by substituting for the heavy cornice a simple corbel table (as in London Bridge) a greater apparent depth was given to the central voussoirs, while the whole of the voussoirs were treated in a slightly decorative manner, by fluting each alternate one, so as to suggest the idea of their being what they actually were — a facing or *revêtement*, not an essential element in construction. Another design was shown for a different treatment of a pier, with the flat central buttress-member turned round at right angles to the line of the bridge, and carrying the lamps also at right angles to the bridge. This had a very bold effect, and there was something to be said for it in a practical sense. When he had exhibited this design in connection with a paper read a little while since before the Birmingham Architectural Association, one of his audience remarked that it was "Gothic feeling with Classic detail"; and that, in fact, was exactly what he was driving at, and suggested the moral with which he would conclude, viz, that if anything satisfactory was to be done in the architectural treatment of bridges, it would not be by plastering on to them architcetural details meant for quite different situations, but by returning to the mediæval principle of so designing the lines of the masonry as to make them in themselves expressive and characteristic.

"Mr. Aston Webb said he must ask them to pass a hearty vote of thanks to Mr. Statham for his lecture. He did not think there were many ladies or gentlemen in that room who would be likely to build a bridge — he felt sure he would not — and though ladies were becoming architects he did not think they would be asked just yet to put up bridges; but though it was unlikely they would be called upon to build a bridge, it was important that they should have some notion of how one should be built. It was also desirable that where there was a fine bridge — as there was in London and in many of our towns and country places — we should know how to value it and keep it. Mr. Statham had not only criticised the design of bridges which had been erected or were about to be erected, but he had shown them what, in his view — a view with which most of them would agree — were the lines on which bridges should be put up. There was hardly anything more poetical or romantic, he thought, than a bridge. The connecting of two banks by solid material and the passing of traffic over it, or the cross-traffic underneath on the water-way or roadway at right angles to the traffic over, always formed a subject of interest, and must impress even the most unreflective. He thought they would all agree with Mr. Statham that the interest which was connected with bridges was best obtained and preserved by the simple proportions of the bridge itself. We did not want to be distracted by little bits of ornament and misplaced construction, which was really not construction at all. It was not for him to go into a criticism of bridges which had been built or were about to be built, but, as to London Bridge, he endorsed Mr. Statham's remarks in regard to the necessity or not for widening that bridge. It might be a necessity, but whenever he had had occasion to cross the bridge his traffic had never been interfered with, and since the Tower Bridge had been erected he had been able to get across London Bridge with the greatest ease. But if the bridge must be widened — and he supposed they must accept the opinion of those in authority as to that — they were entitled to know what was going to be done, so that they might be in a position to know whether what was going to be done was the best thing to be done; and for this reason he thought the lecture had been of considerable use. One great difficulty in a stone bridge was that the arch, from its nature, was never at rest; it was always pressing out and, to some extent, upwards. Stability was obtained in a building with an arch by weighting it at the top, but that was a thing which, in large-span bridges, which now, of necessity, were constructed across great rivers like the Thames, was almost an impossibility, and a very narrow depth of masonry over the top of the arch must always give, to some extent, an idea of weakness, for there was nothing but a thin line of roadway for the arch to carry. He thought Mr. Statham was right in omitting the cornice in his design for Vauxhall Bridge and deepening the arch as much as possible. Much as we admired London Bridge and Waterloo Bridge, one had to give way — and we gladly gave way — to the French as the great bridge-designers of the day. The new bridge for the Paris Exhibition was acknowledged by all artists and all who were interested in such matters to be a magnificent bridge. We must hope that Vauxhall Bridge would be able in some way to vie with that bridge, but it was not for him to say whether it would or not.

"The lecture was illustrated by more than sixty lantern-slides of bridges of various kinds, arranged so as to successively illustrate the various points touched on in the course of the lecture."

BUILDING-LEGENDS.

UNLIKELY as it may seem at the first glance, there is much that is curious and legendary associated with the matter-of-fact art of building, and in the following lines we shall cite some of these legends and curiosities, which are to be found scattered up and down the country. Thus, it has been written of the spire of Chesterfield Church — which many consider wonderful, though, as a fact, it is only somewhat out of the perpendicular: —

> "Poor devil! poor spite,
> To make a spire a laughing-sight."

This rhyme refers to the perversity of the builder, who originally erected the church without a spire, but, being compelled to add one, made it crooked. One of the legends attributes the mischief to the Prince of Darkness, who one day, being fatigued, folded his wings and rested on the steeple. Some of the incense which was being wafted in the aisles below escaped from the church, crept up the steeple, and tickled the arch-fiend's nose to such purpose that he gave a terrific sneeze, and so dislocated the steeple that it has been twisted ever since! Another tale in connection with this church is that on the occasion of a wedding party passing into the building the steeple bowed to the bride and bridegroom, and has remained crooked ever since. The same tradition attaches to an old church in Lancashire, of which it is said: —

> "The church at Little Winwick,
> It stands upon a sod;
> And when a maid gets married there
> The steeple gives a nod.
>
> "Alas! how many ages
> Their rapid flight have flown.
> Since on that high and lofty spire
> There's moved a single stone."

It is a legend, dating from mediæval, if not earlier, times, that, in the erection of cathedrals and other edifices devoted to ecclesiastical uses, the Prince of Darkness always claimed one human life as a sacrifice during the process of building, and, as if in confirmation of this gruesome legend, there is hardly a cathedral or minster in the world which has not some such story associated with it. For instance, at Shottesbroke, in Berkshire, the tale runs that when the capstone was being fixed on the spire the architect called for wine with which to drink the health of the King, and that after partaking thereof he fell down and was killed. Possibly the wine was drugged, or was very potent. A coffin-shaped stone in the churchyard, bearing the letters, "O! O!" — his exclamation as he fell — is said to mark the spot where he lies buried. The legend of St. Francis of Assisi, who rescued a poor mason from falling, and that associated with Sir James Thornhill's painting in the dome of St. Paul's Cathedral, are too well known to call for recapitulation here.

Many churches have legends associated with them, and generally in reference to some action of a former parson. Thus, the following three jingles, relating to bells, are self-explanatory: —

> "Arlesey, Arlesey, wicked people,
> Sold their bells to build a steeple."
>
> "Owesby parish, wicked people,
> Sold their bells to Kelsey to build a steeple."
>
> "A very fine trick of the Newington people,
> To sell the bells to build a steeple."

Of Berwick, in Sussex, the local rhyme runs: —

> "The parson was poor and so were the people,
> So they sold the bells to repair the steeple."

And it is a fact that only one now remains out of four bells there in 1724. At Mevagissy, in Cornwall, the natives have the following rhyme: —

> "Ye men of Porthilly,
> Why were ye so silly,
> In having so little power?
> Ye sold every bell,
> As Govan men tell,
> For money to pull down your tower."

— *London Standard.*

BURMESE BELLS. — One of the odd things the visitor to Burmah will notice is the large number of bells about the pagodas. These bells are usually hung on sacred posts a few feet above the ground. They are sweet-toned, as all Burmese bells are, but they are not furnished with tongues. The worshipper who comes to pray before the pagoda strikes one of these bells with a wooden mallet. This is to attract the attention of the god. — *Boston Transcript.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

NO. 918 WEST END AVE., NEW YORK, N. Y. MESSRS. HORGAN & SLATTERY, ARCHITECTS, NEW YORK, N. Y.

ENTRANCE TO THE SAME.

APARTMENT-HOUSE, NEW YORK, N. Y. MESSRS. HORGAN & SLATTERY, ARCHITECTS, NEW YORK, N. Y.

DESIGN FOR NEW CITY-HALL, NEWARK, N. J. MR. E. A. MCMURRAY AND MR. F. R. COMSTOCK, ASSOCIATED ARCHITECTS, NEW YORK, N. Y.

PLANS AND SECTION OF THE SAME.

[The following named illustration may be found by reference to our advertising pages.]

PUBLIC PUMPS, LOUVAIN, BELGIUM.

THIS plate is copied from *L'Emulation*.

NOTES AND CLIPPINGS

STATUES IN THE PARIS STREETS. — It is not the Londoner only who grumbles at the lack of beauty in the statues adorning the streets and squares of his city. The Frenchman just now makes a point of grumbling quite as loudly at the "almost unanimous" ugliness of the modern statues "encumbering" Paris. These statues, says the outspoken *Journal des Débats*, are not so much erected in honor of one dead man as for the glorification of several living ones, who form the "Commission" for the erection of a statue, and receive decorations for their endeavors. A famous French sculptor is quoted in this connection, who had sent in his design for a statue of Pasteur. He had suggested the genius of the great scientist by symbols, but the commission would have none of them. "Your work," they said, "is fine, but it is incomplete. What about the diseases of silk worms, the manufacture of vinegar and of beer and *vin*, about cholera in fowls?" And nothing the artist could say as to the impossibility of reproducing sick silkworms and cholera-ridden roosters on a monument could move the commission. Under such conditions, it is small wonder Paris statues are no better than they should be. — *Westminster Gazette*.

OBITUARY. — William Reynolds Snead, President of the Snead & Co. Iron Works, of Jersey City, N. J., manufacturers of structural and ornamental iron-work for buildings, died suddenly in New York City, on Thursday, March 27, 1902. He was forty-one years of age, having spent his time in the business since his graduation from the Massachusetts Institute of Technology, Class of 1881. The Snead Works were pioneers in the use of iron for architectural purposes, and were founded by Charles S. Snead, Sr., in Louisville, Ky., in 1848. They were successfully operated in that city for fifty years. A fire in 1898 destroyed the plant and they were transplanted to Jersey City by the deceased, William R. Snead, where they are in successful operation. Mr. Snead had just begun to realize some rest from the hard work of building and installing and organizing a new plant in a new place when he met his untimely death. He was master of his business and had a large circle of friends. His father, Charles S. Snead, Sr., the founder of the business, is now enjoying a hale old age in his eighty-third year, having retired from active business.

TO JUDGE A RIVER'S BREADTH. — It is necessary to make use only of the eyes and the brim of a hat to measure the width of any ordinary stream, or even of a good-sized river, and here is the way to do it: Select a part of the river bank where the grounds run back level, and, standing at the water's edge, fix your eyes on the opposite bank. Now, move your hat down over your brow until the edge of the brim is exactly on a line with the water-line on the other side. This will give you a visual angle that may be used on any level surface, and if, as has been suggested, the ground on your side of the river be flat, you may "lay off" a corresponding distance on it. To do this you have only to hold your head perfectly steady, after getting the angle with your hat brim, supporting your chin with your hand, if necessary, and turn slowly around until your back is towards the river. Now, take careful note of where your hat brim cuts the level surface of the ground as you look over the latter, and from where you stand to that point will be the width of the river — a distance that may readily be measured by stepping. If you are careful in all these details you can come within a few feet of the river's width. — *Detroit Free Press*.

A COLLECTION OF TAVERN SIGNS. — The April exhibition at the Guildhall is to be of French and English painters of the eighteenth century, and one feature of it should be particularly interesting to our readers who contributed so many instances of curious tavern signs. For a collection of signboards is to be made, and already French collectors are being asked for specimens of Chardin, Lemoynes, Nicholas Watteau, and other famous artists who paid their tavern scores with their brush. This method of payment has been common enough with young or struggling artists. The late T. Sidney Cooper painted his way to Brussels; the Royal Oak at Bettws-y-Coed has a signboard done by David Cox, and there are few of the old-fashioned inns on the Thames which cannot show pictures which were paid for in kind. — *London Chronicle*.

A MALLEABLE-GLASS PROCESS. — Louis Kauffield, says a despatch to the Boston *Transcript*, a glass manufacturer of Matthews, Delaware County, after experiments covering two years, announces that he has discovered the method of making malleable glass, long considered one of the lost arts. The manufactured product is not sensitive to sudden changes of heat and cold and may be moulded very much after the manner of iron. Kauffield says he has dipped almost red-hot lamp-chimneys of the new glass in water that was icy cold and they were not affected. The new process promises the making of cooking-vessels out of glass, and the use of glass in stoves. Mr. Kauffield also believes that he can weld the glass together. Manufacturers who have seen the Kauffield experiments speak highly of them.

HOW THE NEW-YORK SUBWAY WILL CROSS THE HARLEM RIVER. — But one other interesting feature of the work of construction need be described — the building of the tunnel across the Harlem River. Here a problem of selection was presented which for a time puzzled the engineers. More than thirty different plans, any of them feasible, were suggested. In the end, the one which at first sight would seem the most difficult was decided upon. Two lines of sheathing were driven into the bottom of the river at a distance apart equal to the width of the channel. The planks were placed close together, so that when the wood swelled by the action of the water, the joints became practically water-tight. A platform, called the "roof," was then rested on top of the sheathing, and a third wall, at right angles, and touching the ends of the first two walls, completed a box, which, when pumped dry, allowed the men to descend and dig out the bottom of the river. As the sub-river soil was removed it became necessary to load down the roof of the box with weights in order to prevent the sheathing from floating. But half the width of the stream could, of course, be thus worked at a time, as navigation had to be kept open by the other half. — *Pearson's Magazine for April*.

ELECTRICITY AT ST. PAUL'S. — On Easter Sunday last, St. Paul's, in London, was, for the first time, radiant with the electric-light. It is three years since the change was decided upon, and ever since the work of preparation has been going on. Miles and miles of wire have been taken into the crypt, and carried up in galvanized pipes, through the shafts in the walls which bring the rainwater ducts from the roof, to the various points where the wire is required to enter the building. The supply is taken from the Charing Cross and the City of London companies, so as to guard against a possibility of failure. The complete scheme of lighting requires about two thousand glow-lamps, but owing to the expense only part of the work is done at present. The ring of gas-jets around the "whispering gallery" at the base of the dome is left, as to replace them would need six hundred lamps. The wiring has been completed, and there only remains the introduction of the standards and pendants in the cathedral, which will be of ornamental brass, partly furnished by conversion of the existing gas fittings. The work is being carried out under the supervision of Mr. Harding, clerk of the works of the cathedral. Naturally, the adaptation of electric-lighting to such a building as this great metropolitan cathedral, a work for which no precedent exists, has given ground for the utmost variety of opinion. Seven years ago an experiment was made in lighting St. Paul's with arc-lamps. At dead of night, that the public might suspect nothing of the startling innovation proposed, the Dean and Chapter stole silently on tip-toe into the building, and after some delay the great moon-shaped lamps suddenly blazed forth. A single trial was sufficient to condemn the arc-lamps, but even with glow-lamps there are many ways of lighting a cathedral. First of all, there is the architectural way, by which the outlines of arch and frieze and spandrel are marked by lines of lamps. This has the advantage of being the cheapest system, for the lamps can be attached direct to the cable, and no pendants or standards are required. It also shows the form and proportion of the building, in what many consider a pleasing way, but the cathedral authorities did not think the plan worthy of St. Paul's. Then there is what may be called theatrical church-lighting, in which concealed lamps throw a bright illumination upon some central point or figure. The altar of St. Alban's, Holborn, is illuminated by hidden lamps in this way, and some popular American preachers during their sermons have the lights turned low and a lime-light directed towards the pulpit, causing the congregation to see them enveloped in a sort of saintly radiance. At St. Paul's itself, when the new reredos was erected screened gas-lights were at first employed to illuminate it, but the plan was abandoned as not in the best taste. One other use of the electric-light in church we may describe as the "ecclesiastical." It is to be seen at St. Saviour's, Southwark, where imitation candles made of china have tiny glow-lamps, in place of flame. This form of altar-decoration has been rejected at St. Paul's as meretricious and gaudy, and the lights are arranged purely for congregational use. They are therefore placed — whether erected on standards or suspended from above — as nearly as possible in a plane, about 15 feet above the floor. For reading this will give the maximum effect, and although the richly-carved marble and sparkling gold incrustations of the upper part of the cathedral will not be in the most brilliant light, they will be seen as well as by the gas heretofore used. — *Boston Transcript*.

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, APRIL 19, 1902 No. 1373

CONTENTS

SUMMARY: —
The Municipal Art Society of New York and the proposed "Model City" at the Louisiana Purchase Exposition. — Partial Similar Attempts at previous World's Fairs. — The Infractions of the Law by New York Theatres. — Building-accidents in New York. — The Louvre Collections and their Exposure to Fire. — The Central American Field for Archæological Research. — Dust Explosions in Mines and Mills. — The Gains and Losses affecting Users of Natural Gas. . . . 17
THE UNKNOWN BERNINI. 19
A PLEA FOR WOMEN PRACTISING ARCHITECTURE. 20
A FOUNDATION ON QUICKSAND. 22
SOCIETIES 23
ILLUSTRATIONS: —
United States Custom-house and Post-office, Brunswick, Ga. — Plans and Section of the Same. — Detail of the Same.
Doorway: Palazzo Brancoli-Busdraghi, Lucca, Italy, — Doorway: Palazzo Cittadella, Lucca, Italy. 23
COMMUNICATIONS: —
Danger from Wooden Staging in Westminster Abbey. — The "Exuberance" of Messrs. Horgan & Slattery. 23
NOTES AND CLIPPINGS. 23

WE are very glad to receive from the Municipal Art Society of New York an official statement of the plan which has been drawn up by its committee on the proposed exhibit of a model city at the St. Louis Exposition of next year. This plan, which is founded on one prepared three years ago by Mr. William S. Crandall, as secretary of the Exhibition Committee, and submitted to the management of the Buffalo Exposition, but not carried out, from lack of funds, is far more comprehensive than the schemes published in the newspapers and magazines, including even an exhibit of the methods for securing uniformity in municipal accounts which have, of late, engaged the attention of reformers, as well as one of a model health department, introducing, for example, the sterilized-milk stations maintained by the municipality in Rochester, N. Y., and in New York City by private benevolence, by which the mortality among infants has been greatly reduced. These features, although not architectural, are quite as essential to a well-organized city as asphalt pavements or well-designed park railings; and it is very much to the credit of the Municipal Art Society and its representative that this fact should have been recognized. While the profession, naturally, interests itself more in the artistic features of a city, people generally will be more attracted by the novelties in sanitation, transportation, lighting and sewage-disposal which the Society includes in its programme, and the people who come to look at the sewage-irrigation model, or the vestibuled electric-cars, or the acetylene street-lamps, will finish their visit by an inspection of the artistic signboards and æsthetic bridges, which they would never have looked at by themselves.

IT seems to us that, with proper management, a comprehensive scheme of the sort proposed by the Municipal Art Society might be made the most valuable and conspicuous feature of the Louisiana Purchase Exposition. In Paris, in 1900, a great deal of attention was attracted by the scattered elements of what would, under this scheme, be advantageously collected and systematized. In one series of rooms at Paris, for example, was a collection of plans, models and pictures of hospitals and asylums, which offered great interest. Some of the Russian hospitals were shown by means of miniature buildings, the roof of which opened like a lid, showing the little beds, with the tiny patients, half an inch long, in the wards; many other establishments were represented by models in relief of the buildings and grounds; and, in general, great efforts were made to have the exhibits as realistic as possible. So, in the school department, rooms of the actual size were shown, the Russians, who were conspicuous in all these branches, presenting, for example, a village library complete, including all the fittings and furniture, even to the books on the shelves. In another building, at some distance, was an exhibit, with real babies, of the "couveuses d'enfants," or establishments for bringing up sickly or prematurely-born infants by keeping them in a uniform temperature, in plate-glass cases, which have been found so valuable in France; and in other portions of the Exposition grounds, even as far as Vincennes, were scattered extremely interesting examples of municipal utilities of various kinds. The plan of the Municipal Art Society, to show these things together, as they actually occur, would add greatly, not only to the convenience of studying them, but to the interest of each, and we earnestly hope that it may be found practicable to carry it out.

THE new methods of government in New York have begun to be applied to the theatres. Every architect knows that the building-laws concerning theatres in New York are very strict, and are, on the whole, very judiciously drawn up; but a circumstance less generally known is that, in the case of many new theatres, not the smallest pretence of obeying them has been made. According to evidence collected by the new municipal officials, a considerable proportion of the newest theatres, instead of being practically fireproof, as the law requires, are fire-traps of the most dangerous description, the safeguards demanded by the statute having been deliberately omitted, apparently with the acquiescence of the inspectors. It is gratifying to learn that a list of the deficient theatres is in course of preparation, and their proprietors will be presented with the alternative of remodelling their buildings in such a way as to bring them into conformity with the law, or having them permanently closed. Another police regulation of great importance, which absolutely prohibits the placing of seats in the aisles or passageways of any theatre, hall, church or other place of public assemblage, is also constantly violated in theatres of a certain class. Until now, the proprietors of these theatres, presumably in consequence of a private understanding with the police authorities, have escaped punishment; but warnings have now been issued that the law will be enforced, and New York theatres will have their aisles cleared of seats, or their proprietors will go to prison. It is hardly necessary to point out that, in case of fire in a theatre, obstructions in the aisles may easily cause the death of multitudes of people. All persons who go much to the theatre should bear constantly in mind the fact, proved by many examples, that the average time which elapses between the appearance of fire in the auditorium of a theatre, and the death of every person remaining in it, is less than three minutes. In other words, any person who does not get out of a theatre in less than three minutes after fire makes its appearance will never get out alive, and the obstruction of the passageways by seats simply ensures the death, in case of fire, of all the people in the front portion of the house.

A NEW inconvenience has been found to attend the construction of high buildings. In New York, last week, the inhabitants of a house on Fifth Avenue were disagreeably surprised to have a block of granite, weighing seven hundred pounds, let fall from the sixteenth story of a hotel in process of erection next door, come through the skylight over the main staircase, and continuing to descend, accompanied by a shower of broken glass, demolish two stories of the richly-carved staircase, and finally land on the hall floor, after doing damage to the extent, as the owner estimates, of ten thousand dollars, without including the annoyance to the inmates of the house, who, their staircase being destroyed, were obliged to use the fire-escape to go to and from their bedrooms. Almost on the same day six beams, which were being hoisted to the fourth story of another new building on Fifth Avenue, dropped from the chain which held them upon the roof of a picture-gallery next door, two of them breaking through the skylight, and falling to the floor. About thirty people were in the gallery at the time, but, fortunately, no one was injured.

LA CONSTRUCTION MODERNE calls attention again to the danger to which the precious collections of the Louvre are exposed through the installation in the building of the Ministry of the Colonies. It is now nearly twenty years since the French Government, by a formal decree, ordered that all the buildings of the Louvre, without exception, should be devoted to the purposes of the museum which bears the name of the palace. The ink was hardly dry on the decree when a portion of the palace was taken, "temporarily," for the accommodation of the Ministry of the Colonies. In accordance, apparently, with the "temporary" purpose of the installation, the

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

changes made in the building were of the flimsiest and most dangerous character. At the very outset, one hundred and sixty-five small offices, with the incidental corridors and passage-ways, were made by dividing the great rooms of the palace by partitions of spruce boards, and stretching above them ceilings of cheap thin cloth. This was a tolerably incautious proceeding on the part of people whom American architects are continually reviled for not imitating; and the subdivision has since been carried still farther, in the same style. As M. Planat says, the whole affair would burn up "in the wink of an eye," if it once took fire, and the officials of the Ministry of Colonies are so impressed with the danger to themselves and their subordinates which the construction presents that they have caused placards to be posted among the offices, giving directions where to run for safety at the first alarm; yet, in spite of the obvious and imminent risk which the installation involves to the remainder of the building, which, it must be remembered, has floors throughout of wooden beams, covered with waxed boards, and lofty mansard roofs, all framed with wood, and covered with boarding, sheet-lead and glass, and the certainty that even a small fire in the galleries would effectually ruin the priceless treasures of art which they contain, this "temporary" installation has been allowed to remain for nearly twenty years, and there is still no sign of its removal. Another circumstance which makes the invasion by official intruders of the premises declared by law to be entirely reserved for the national museum is that the offices of the Ministry of the Colonies occupy room which is urgently needed for the display of objects which belong to the museum, but cannot be shown, for lack of space in which to display them. For example, a magnificent collection of French paintings of the last century, valued at several millions, was recently bequeathed to the Louvre by M. Thomy-Thiéry, of the island of Mauritius; while a fine collection of Greek and Roman antiquities, belonging to a noted amateur, M. de Clercq, has also been bequeathed either to the Louvre or the Cabinet des Médailles, preference being given to the Louvre. Neither of these rich collections can be shown, and the De Clercq collection may be lost in consequence; and the officials of the museum report also that it has been impossible to place before the public the magnificent collection of drawings by old masters which it possesses, on account of the impossibility of finding room to show them. It is hardly necessary to say that the preservation of the Louvre and its contents, and the proper display of the artistic riches which it possesses, are matters which concern the whole civilized world; and nothing, perhaps, would give pleasure and relief to so great a number of persons as the announcement that the Ministry of Colonies had departed, with all its furniture and paraphernalia, from the building which is generally recognized as the very centre of art.

PERHAPS the most important field for archæological exploration that the world now affords is to be found in Yucatan. Although Central American antiquities do not appeal to average people, who are more interested in Romulus and Numa Pompilius, or Achilles and Priam, or Theseus and Ariadne, and the times in which these personages lived, than in the subjects of the undecipherable hieroglyphics of Copan, men of real science are inclined to believe that there was, in times more ancient, perhaps, than those of which even the Assyrian and Cretan records give us knowledge, a mysterious connection between Central America and Asia, if not, as there seems to be some reason for supposing, between Central America and Egypt. It is unlikely that any of the existing ruins in Yucatan date back to the period of such connection, but the inscriptions with which they are covered may, when they are deciphered, refer to traditions of extreme importance to the history of the human race. In this part of the world, moreover, archæological explorers enjoy an advantage which is hardly found in any other, that the present inhabitants are, so far as is known, the direct descendants of those who occupied the country, perhaps, ten thousand years ago. While nearly every other region of archæological interest has been conquered and occupied by a succession of different races, the Mayas have, so far as we know, never been driven from their homes by strangers, or compelled to submit to foreign innovations. They have the advantage, also, of being ignorant enough to have no literature, and hardly even a written language, and their traditions are, on that account, much more likely to have been kept pure. When the inscriptions on their ancient monuments are read, and compared with the verbal traditions collected by some one as familiar with the Mayas, and as thoroughly in their confidence, as the lamented Cushing was with the Zuñis, it is, perhaps, not too much to expect an archæological sensation comparable with that which followed Rawlinson's discovery of the key to the cuneiform writing.

ANOTHER dust explosion in a coal-mine in Tennessee has added twenty-two victims to the long list of those who have been sacrificed to the carelessness or ignorance of people who ought to know better in regard to the explosive character of an atmosphere charged with inflammable dust. In this particular mine it is customary to spend the earlier part of the day in drilling holes for blasting, and, toward the end of the afternoon, the miners charge the drill-holes, adjust the fuses, and make their way to the open air, leaving two men, whose duty it is to light the fuses. The mine seems to be carefully operated, for the men are required to carry safety lamps, and the two "firemen" are under orders to wait until the others are in safety before lighting the fuses. It is probable that in the present instance the firemen were in a hurry to get home, and thought, as usually happens, that there was no harm in stretching their instructions, if nobody was near to see them, for, in a few minutes after the time for the other miners to leave work, and while they were still coming out of the mine, a terrific explosion took place, tearing to pieces the building over the mouth of the mine, killing some men who stood near, and, of course, annihilating all those who were in the mine, or on their way out of it. A certain amount of "firedamp" occurs in the mine, and may have contributed to the explosion, but it seems most probable that a blast, badly tamped, or unskilfully proportioned, blew out of the drill-hole, setting fire to the explosive mixture of coal-dust and air which filled the mine. Several similar accidents have taken place in the same and neighboring mines within a few years. As our readers know, explosions of this sort often occur in saw-mills, flour-mills, cotton-mills and other places where the air is filled with fine dust, but the exact nature of the explosive action, and the conditions on which it depends, have been very little studied. In saw-mills and flour-mills it is now usual to draw off the dust by means of ventilating-fans, but anything of this sort would hardly be practicable in coal-mines, and the problem of removing the dust in such places, or of keeping it from exploding, still awaits solution.

A FEW years from now some one, we hope, will write a history of the natural-gas industries in this country. For two years or so the flow of natural gas from the wells has been diminishing, so that, instead of an almost uncontrollable pressure, often amounting to three or four hundred pounds to the square inch, the disposition of the gas to escape has become so languid that, in many cases, it must now be sucked out of the wells by air-pumps, and forced into the distribution mains, while, in others, not even this process suffices to secure a supply. The manufacturers who used the natural gas have been the worst sufferers by the failure of the supply; but the makers of plate-glass, who were able, as long as the gas lasted, to produce a beautifully clear and uniform material, have taken advantage of their experience to establish apparatus for manufacturing coal-gas, which is forced into the mains designed for natural gas, and will, undoubtedly be quite as effective in maintaining the clearness of the product, while it will have the advantage of being more uniform, and more reliable in quantity. In some of the Indiana towns in the gas-district, the owners of private houses are arranging to combine for the purpose of making artificial gas, with which to feed the furnaces and fireplaces once supplied with natural gas, and the example will, undoubtedly, be widely followed. It may be suggested that the agents of the Mond process in this country might, perhaps, do worse than establish themselves in Pittsburgh, Buffalo and Indianapolis, and arrange on a large scale for replacing the natural gas with the Mond gas, properly enriched. The main expense of the installation, that of furnishing and laying the mains and service-pipes, is already paid, and the Mond Company could probably secure the use of them on very favorable terms from the owners, who, having no longer natural gas to send through them, must either abandon them, or dig them up and sell them for old iron. In England, the Mond Company can furnish and lay its own pipes, and sell gas for about ten cents per thousand feet; so that, with the use of mains and service-pipes at a nominal expense, it should be possible to furnish the same gas here at rates very little, if at all, higher than those paid for the natural gas.

THE UNKNOWN BERNINI.

EVERY one knows that Lorenzo Bernini, at once architect and sculptor, as the favorite of Urban VIII and his successors in the papal chair, had at Rome during the seventeenth century a princely standing. Everybody knows, likewise, that Bernini, especially in his last years, became the greatest artist of his time, that the piazza of St. Peter's, his architectural *chef d'œuvre*, is one of the grandest architectural ensembles in the world, and also that his sculptural work is very ostentatious, and that which most closely rivals the sculpture of Michael Angelo; but, perhaps some of my readers will be surprised to learn that Bernini, artist in all kinds, like Orcagna and Leonardo, was an adept in caricature, a dramatic author, and himself prepared theatrical decorations, being greatly interested also in the machinery of theatres. If the fancy for Barocco art had not sprung up during these latter years in Italy, and had not the advanced spirits of the time given themselves over to the consideration of every kind of art movement, assuredly this new and curious side of Bernini's character would have remained for a long time unknown; for the favorite of Urban VIII did not arouse the interest of artists and students until our own day, and it is to a student of Bernini that we owe these new facts concerning the unknown side of the artistic life of the subject. Already, to tell the truth, Baldinucci, in a biography of Bernini which he wrote, had pointed out that the master did practise caricature; but the mere words of Baldinucci made no particular impression, and if chance had not led to the discovery of the Berninese caricatures, no one, in all probability, would have given any heed to what Baldinucci wrote. He said, apropos of Bernini, after having praised the extraordinary freshness of the drawing of the human figure in his "Hero": "The effect of this frankness has been that he labored singularly in that kind of drawing which we call caricature, where the pen-stroke which burlesques the image of another still preserves the resemblance and even the majesty, if sometimes the caricatures were those of princes, as happened frequently enough." We know from another source that a certain quantity of caricatures flowing from Bernini's pen were found in the Galleria di San Pastore, in the villa of Terra di Gallicano, inhabited by the Dominican Fathers, to whom the master had given them. It is also important to remark that these caricatures were sent to princes, in homage and as testimony to the intellectual activity of Bernini. In fact, Signor Fraschetti discovered lately a letter, dated 1652 at the Court of Este, in which there is question of two caricatures by Bernini, one representing the Cardinal Trivulzio and the other a certain Giaconazzi, a servant of Cardinal Pamphily's. In this letter, by a certain Francesco Gualengo, it is said that the latter sends to His Most Serene Highness two caricatures, in the knowledge that everything which comes from the hands of the eminent artist is accepted with pleasure by His Majesty.

The discovery of the caricatures of Bernini, some of which I here reproduce in support of this letter, has been purely accidental. Of late, they were rearranging the engravings and drawings in the Corsiniana Collection, and this led to a more attentive study of these drawings, and to the conclusion that the caricatures in question were the work of Bernini. It is perfectly true that they are not signed, but all the connoisseurs, supported by arguments whose probability I for my part admit, in face of these caricatures in the Corsiniana can think only of the name of Bernini.

Almost all of the caricatures are accompanied by inscriptions which help in the identification of the subjects.

No. 1 bears a legend, in Italian, of course: "A French Chevalier." It represents a sufficiently aristocratic type, perhaps sketched by Bernini during his sojourn in France at the time he was preparing his design for the façade of the Louvre. A very curious feature, apart from the elephantine nose, is the suppression of the eye. Perhaps, in this chevalier, the eyebrows wholly eclipsed the little eyes. No. 2, likewise, has its legend: A captain of the "Company of the Romanesques," throwers of stone (*sassaioli*) in the wars of Urban VIII. For a long time Rome was famous for its stone-fights between groups of people who inhabited different quarters of the city, and sometimes these street-fights resulted in death and great grief to many families of the great city. Bernini, in his caricature of the Captain, has admirably expressed one of the types of the Roman populace, a type which we still meet to-day in the city streets — curious-looking creatures with long necks and very small eyes which seem to be aiming at an enemy at the very moment of attack. No. 3 is that of a Venetian advocate, a laughable type of a man, quiet, and content with the joys of life. No. 4 carries a legend, and is recognized as the caricature of Cardinal Antonio Barberini, born in 1607, an empty-headed but superb man, whose whole value consisted in his being the nephew of Urban VIII. No. 5, beside it, represents the Cardinal Chigi when he was a young man. This Chigi is Fabio Chigi who became pope in 1655, under the name of Alexander VII. The last of the series represents the head coachman of the Infantado of Spain, a sufficiently vulgar type, with frowning eyes and neglected hair. Unquestionably, the caricature is more interesting than the original could have been. I won't waste time over the other caricatures, which anybody can see at Rome in the cabinet of engravings in the National Gallery. The sketches which I have given are more than sufficient to show the style of Bernini as a caricaturist.

Now we must recognize the architect of the Piazza of St. Peter's as a dramatic author and an inventor of theatrical decorations, according to the revelations of Signor Fraschetti. In the first place, we must know that comedies, melodramas, tragedies and other productions of the kind held, during the first half of the seventeenth century, a place of great favor in the city of the popes. Foreigners came to Rome to be present at theatrical representations which sometimes were very loose in their morality, and enthusiasm over these representations reached such a point that, in 1644, the French, as a mark of their pleasure, erected a theatre on the Piazza Navona, and there gave shows for the people. We know that the comedies most in vogue at Rome were those which abounded in *bons mots*, which were aimed particularly at personages about the Court.

Amongst the comedies composed by Bernini, a memory of one in particular is preserved; namely, that entitled "The Inundation of the Tiber," apropos of which we read, in documents drawn from the archives of Modena, dated February 16, 1638, the following words: "The Chevalier Bernini, Monday evening, presented a marvellous comedy, and absolutely there were three scenes which struck everybody with wonder." According to the account given of this comedy, it appears that the author secured his effects by stupefying theatrical *coups* and by the vivacity of his dialogue. If we follow the documents of the times, we find that one of the spectators wrote these words:

"I have been to Bernini's comedy [it is still a question of the 'Inundation of the Tiber'] and, to tell the truth, it must be confessed that only he knows how to compose works like this, not so much for the quality of his machinery as for the manner in which the recitations are given. There was an inundation of the Tiber and a fall of

a house with three persons in it, two feigning death and one pulled out half dead, and all the three carried across the stage with a feeling for art of the highest character, and with equal naturalness; but one in particular, the wounded one, smashed almost to pieces in every part of his body (and surely this was very artfully carried out), both amused and terrified us. At the end, the scene opened and there appeared a perspective of extreme beauty at the back of the theatre. This represented a comedy and the players, and, at a considerable distance, many spectators, partly painted, and part moving to join them, some on foot and some a-horseback, some in carriages and some in litters."

In another account by a spectator we read that even Bernini played a rôle. He was arrayed in the costume of an old Florentine, and took part in two scenes, in each without attempting to make Florence appear greater than Rome, he representing the most commonplace habits of the Florentines. The writer concludes his tale by saying that "the comedy was full of pleasantries and masterly strokes, but, nevertheless, more disguised than was usual, Bernini having named nobody, but always relying on general terms which were far from giving offence."

Documents also announce the existence of another famous comedy, "The Comedy of the Two Theatres," by Bernini, played at the carnival of 1637, and, from investigation, it appears that, two years before, Bernini had a satirical comedy played, in which he presented on the stage an ox, to satirize a Borgia, whom the pope had called an "ox in armor."

Bernini, besides his "Two Theatres" and the "Inundation," also produced other comedies more or less meritorious and spectacular. We mention "The Fair" and "The Sea," in which the artist produced the illusion of sunrise, and succeeded by the use of admirable engines. We will also mention "The Palace of Atlas and Astolphus," and the "Means of paying homage to the ladies in comedy." Bernini's importance as a dramatic author consists in this, that he, as they say, was the first to introduce at the theatre the grand spectacular comedies. The imagination and the talent of the author served him admirably in these representations.

It is for this reason, perhaps, that the dramatic artist also became a painter of theatre decorations. That Bernini practised painting everybody knows, but that the master ever placed his brush at the service of the theatre is less known to my readers. At any rate, it is incontestable that Bernini, having introduced, or enlarged, the frame of comedies so as to involve stage machinery, gave himself up to the painting of the decorations, just as in Italy before him certain painters, for instance, Andrea Del Sarto, Baldassarre Peruzzi, Raphael, Tribolo and others had done the same thing from time to time. In this connection, an interesting bit of testimony of the time is one that I found in documents bearing date of 1634. We read that, "In January, 1634, there arrived at Rome a brother of the King of Poland, the Prince Alexander Charles, in whose honor Cardinal Antonio Barberino caused to be reproduced the 'History of Saint Alexis' by the ablest musicians, with marvellous decorations invented by Bernini, which were changed several times, causing to appear palaces, gardens, forests, hell, and angels who, while speaking, actually flew; and at the end there was shown a large cloud which opened and brought to view the glory of Paradise."

Bernini amused himself and amused the people by painting caricatures amidst these decorations, and on the curtain of the Roman theatre he introduced caricatures of the Marquis Biscia which caused the very select audience to be convulsed with laughter.

It is a pity that time has exercised its pitiless work upon these productions of the unknown Bernini from which I have just lifted the curtain. To tell the truth, as a painter Bernini is an artist of mediocre merit, and even less than mediocre. Facts bear proof that he did not consider himself a painter, but with his own hands destroyed several of his canvases, and the altar-piece in the Vatican Gallery of Mosaics, painted by him, one of the rarest paintings which is preserved of the master, — attributed, by the way, also to Carlo Pellegrini, — does not belie the judgment which the world has passed on Bernini as a painter. Nevertheless, theatrical decorations demanded more imagination than altar-pieces, and all these decorations, full of spectacular architecture, trees, fruits, flowers, might have attained unheard-of effects, seeing that they proceeded from an artist as marvellously endowed as Bernini in all that concerns decorative pomp and the brilliancy of moving effects. ALFREDO MELANI.

MORE VAGARIES OF UNIONISM. — A few weeks ago, some painters who were redecorating the interior of a church in an English town ceased work because women were employed to clean the droppings of paint on the pews, and the employers had to finish the job themselves. And quite recently in a seaside town there was a strike of teamsters, because their employer refused to discharge a driver who had made a journey to a neighboring town three hours quicker than they themselves had been accustomed to take. — *Exchange.*

A PLEA FOR WOMEN PRACTISING ARCHITECTURE.[1]

I APPEAR before you to-night with a certain amount of diffidence, as the subject under discussion is not of my own choosing, and I fear I cannot do it justice. The title, to start with, is somewhat misleading. The dictionary says "plea" means a lame excuse or apology. Now, I do not propose to offer any lame excuses or apologies, all of which would be unnecessary under the circumstances. I shall merely bring to your notice some facts relative to woman and architecture, with most of which you are, doubtless, already familiar. Then, again, the title seems to suggest that I am conscious of a feeling against women architects, and, since I read the paper before your Association, it further implies that I believe such hostility is to be found amongst your ranks. Now, I wish it to be clearly understood that I disclaim both of these assumptions. Doubtless your committee had their thoughts directed to the choice of this subject by the knowledge of the existence of this feeling; but, personally, I have never met it. No one has ever maintained before me that a woman should not practise as an architect, and, if this view is held, I venture to think it can only be held by those outside the profession, who are consequently not acquainted with the functions, powers and responsibilities of an architect.

Since you are members of the profession, it seems superfluous to address you on the subject, as you must know better than any one what are the qualifications necessary for the exercise of the same, and therefore know better than any one that it is not a case of man or woman being best fitted to practise this art, but that it is entirely a case of personal capacity.

In a back number of the *British Architect* I came across the following remark: "Whether women, as a whole, are fitted to take up the profession of architecture we hold somewhat strong and, it may be, conservative views — views which we do not think it would serve any useful purpose to discuss." I hope very much that some one present holds similar strong and conservative views, and that he will be kind enough to express them to-night, as I may tell you the subject was selected by your committee as being a peculiarly useful and suitable one.

It would be a bold man who would assert that "women, as a whole," are fitted to take up the profession, considering so few women have turned their thoughts in this direction; but it would be a still bolder man who would assert that men, as a whole, are fitted to take up the profession, *vide* the enormities that are daily committed by men in the name of architecture. I repeat, it is not a case of men *versus* women; it is a case of individual capability and aptitude.

However, there are some people, we are given to understand, who maintain that woman, *per se*, is unsuited for practising our art. Wherein the weak point lies we shall, no doubt, discover in the course of the evening; but as far as I can judge, it lies outside the woman, and is not a defect inherent in her. I suppose the reason why woman should not practise architecture is because, except in one or two isolated cases, she has not practised it hitherto; and this is no reason at all.

The same objection is brought forward every time that women have attempted to enlarge their sphere of action, and yet yearly new proofs are given that intellectually women can, at least in many cases, hold their own with men. The results of university examinations show it; members of the medical profession testify to it; the legal profession numbers women in its ranks, both in France and in America, though up till now in England women have only been allowed to study for, but not to practise at, the Bar. "Let them study by all means," the conservatives say, "but draw the line at practice." And what is the use of instruction, I ask you, if it is to be turned to no purpose? What is study without an object? Knowledge without application? It is simply creating wants without granting the power of satisfying them. Living is not learning, but applying what one has learned.

If, then, it is granted that woman is intellectually capable of wrestling with the problems of architecture, are we to suppose that she is physically incapable of carrying on the work entailed? It were unreasonable to say her strength is not equal to the task when we see what women actually do in this country. Take chain-makers, for instance. Hundreds of women are employed in the very heavy work of chain-making, a most arduous trade, and you must remember how two or three years ago certain philanthropists were anxious that legislation should put a stop to this, as they asserted the work was too great a strain for a woman. This intervention only resulted in the Home Secretary being besieged by indignant deputations of these same women, all protesting their competence and defiantly baring their muscular arms as evidence of the strength on which they prided themselves. Then, again, our agricultural laborers are not, by a long way, all men. In harvest-time, when the work requires to be got through with all speed, women are called upon to labor side by side with their husbands and brothers; they toil from earliest dawn to latest twilight, through all the burning heat of the early autumn day, and so far from succumbing to this exposure, they weather it with the best of the men and live to seventy and eighty years of age. Now the bodily fatigue an architect must be prepared to undergo cannot be compared to the physical strain our women endure when employed as field-farers or as chain-makers.

I do not mean to make light of the arduousness of the profession. The mere study of architecture involves a great deal of physical as

[1] A paper read by Miss Ethel M. Charles, A. R. I. B. A., before the Architectural Association and printed in the *Architect*.

well as mental strain, and since practice means the continuance of study and, added to this, responsibility, the profession is certainly not one to be adopted by the physically feeble. But women are not all physically feeble any more than men are all physically strong. You have heard of architects — men — breaking down through overwork, but you would not for that reason say that all men are unfitted to practise the profession. I have never heard of a woman architect breaking down, but neither do I assert that all women are fitted to practise architecture.

Those who base their objections to women architects on the fact that they are an innovation, and therefore to be suppressed, will fling their prejudices and fears to the winds when what is now an innovation comes to be a recognized institution. Already in America one town has a lady for a consulting architect, and we are given to understand that her designs for schools, prisons and railway-stations compare favorably with other similar works in the country.

But there are some opponents who are more specific in their objections, and it is with these we must now deal. Their objections really arise from an imperfect knowledge of what an architect is. There is a general idea that architects "make plans" and climb ladders, but beyond these two accomplishments nothing certain seems to be known. The former occupation is acknowledged to be quite a legitimate one for a woman, provided she have the necessary gifts, but the latter cannot be countenanced for a moment, even though she may be sufficiently courageous to attempt it, and can be trusted not to lose her head on the scaffolding. As far as I can gather, it is not the climbing that is objected to, but the fact that she may be seen climbing a ladder. Therein lies the difficulty. No less an architect than Wren shows us a way round, if not over it. The famous Duchess of Marlborough informs us Wren "was content to be dragged up in a basket, three or four times a week, to the top of St. Paul's, and at great hazard, for £200 a year." No one could object to a woman being hoisted up in a basket any more than they could object to her making use of the more conventional elevator. Climbing a ladder is condemned as unwomanly, but so was riding a bicycle or being seen on the top of an omnibus not so very long ago, and yet all are now seemingly reconciled to these unwomanly practices. Besides, the ladder question could only be raised by persons who are in ignorance of the portion of a lifetime that an architect spends upon a ladder, and as this is so infinitesimal it is unworthy of consideration.

But besides the objector to innovation and the objector to ladder-climbing, there is the man who has dealt personally with achitects as their client, and who knows very definitely what an architect is and what he expects from him. He must be a thoroughly artistic, scientific and practical man. He must be able to design at all possible speed a convenient, durable and beautiful building of any one of the three groups into which buildings may be roughly classified — Domestic, Ecclesiastical and Civil. He must have an intimate and familiar knowledge of every material and every trade employed in the realizing of the said building, in order that none but the best of its kind and the best of technical skill may be employed. He must be a master of scientific construction, in order to prevent waste of time, material and money. He must keep all accounts relating to the work, bear in mind the interests of client and contractor and manage everything without allowing any friction to come about between the parties concerned. This list is not complete; I have mentioned but a few of the functions required by an employer of his architect. For the sake of argument we will suppose that they appear to offer just so many obstacles to a woman following the profession.

I use the word "profession" because it covers more requirements than art, craft, or faculty, and though it has been weighed and found wanting, it appears to be the word in most general use when connected with the practice of architecture.

To succeed in architecture one must be, as I have said, artistic, scientific and practical in business matters; that is to say, success is largely a matter of natural gifts, education and experience. Now, who will assert that the necessary gifts are not and cannot be possessed by woman; that she does not receive the requisite general education, and that experience may not be acquired by her as well as by man?

Let us look first at the æsthetic side of the question. Architecture has been defined as good construction inspired by an artistic motive or by the instinct of the beautiful. Now this instinct of the beautiful, or, as the French put it better, "ce sentiment du beau," is, as a rule, more strongly developed in the woman. Nearly every woman is more or less impressionable, that is, she is an artist by temperament. Her taste will lead her instinctively and intuitively to a result which a man will reach by a series of criticisms and reasonings. He sees the truth, she feels it. The beautiful is attained by both; what matter if the paths they follow are different?

In most cases (outside the profession, be it understood) who is it who cares to be surrounded by beautiful objects and attempts as far as is possible to make the home a thing of beauty? It is certainly not the average man, who, so long as he is comfortable, cares little for the appearance of his surroundings. It follows, then, that it must be the woman who will cheerfully sacrifice even comfort to her conception of beauty, if any choice have to be made between the two.

Some people go so far as to say that a woman must necessarily know how to plan a house better than a man, because her household duties suggest to her the wants and requirements that must be met. We do not agree with this view. The best housekeeper in the world may have most definite ideas as to what she requires, but she will not produce a plan, that is, the suitable disposition of spaces, till she has learned what rules and precepts must be obeyed in planning a house. And these rules, being all based upon common-sense and obvious reasoning, are as patent to men as they are to women.

We must not, however, lose sight of the fact that the influence of woman in domestic architecture has been felt ever since the progress of social relations made her the equal instead of the slave of man. Women's position in a country is the surest sign of the social progress in that country, and it was in the sixteenth century, when women began to be respected "as a whole," and not in individual instances, that domestic architecture regained its prominence. It was when a woman ruled this country, and by her personality influenced many, that castles, cathedrals and colleges — buildings designed by men for men — ceased to be the most important architectural objects erected. Elizabeth's reign is remarkable for the number of radical changes which took place, and in no direction was the change so marked as in architecture.

At the time when, under James's rule, the Scotch were dwelling in fortresses about as comfortable as a Norman keep, the English, under Elizabeth, were vieing with each other as to who should build the most roomy, most convenient and most beautiful houses. It is noteworthy that the great Queen spent not a penny herself in the interest of building, but she gave her noblemen much moral support, encouraging them to spend their thousands in erecting palaces worthy of receiving her as a guest. One of the most indefatigable builders of that time whose name has come down to us was a woman, Elizabeth of Hardwicke. Of the "three most elegant seats that were ever raised by one hand," so says her biographer, only Hardwicke Hall remains, and, judging from its monotonous symmetry and extravagant window-space, we have, it seems, little cause to regret old Chatsworth and Oldcotes. Besides her three country-seats, this lady left "stately almshouses for twelve poor people" in Derby, and personally superintended the construction of "a splendid mural monument" to her own memory in All Saints Church, Derby. Her biographer, alluding to her passion for building, describes her as "a woman of a masculine understanding and conduct; proud, furious, selfish and unfeeling." Apparently we are to gather that these unattractive qualities, pride, violence and egoism, go hand-in-hand with a masculine understanding. If, as Hardwicke shows, she lacked artistic feeling, she was, on the other hand, a thoroughly practical woman. Of the four husbands she outlived, three were wealthy men who were able to supply her with the means of indulging in her favorite pursuit.

In France, where women stand out more prominently than in England, and during the early Renaissance, when they were most conspicuous even as politicians, warriors and poets, we find them occupied with building at an earlier date than at home. Marie de Pierre-Vive, Dame du Perron, one of the ladies of the household of Catherine de' Medici, was officially associated with Philibert de l'Orme during the erection of the Tuileries. In 1566 her name stands among the list of "MM. les Surintendants des Bastiments du Roy," and it is interesting to note that where she and De l'Orme signed papers together, Dame du Perron's name comes first. Her royal mistress was another woman of "a masculine understanding," and insisted on her own plans being used for her palace. De l'Orme writes to her, "Lequel Palays je conduis de votre Grace suivant les dispositions, mesures et commandement qu'il vous a plait m'en faire."

But however artistic a woman may be, her natural gifts alone will not suffice any more than will those of a man, without study and direction. Art has its restrictions and its limitations, which must be recognized and appreciated, if truth and nature are to be our guides; and architecture is particularly restricted and limited in theory and in practice. In theory it is bound by those rules of art inspired by taste based on traditions, and by those rules of science which can be demonstrated by invariable and absolute formulas. And in practice it is limited by structural conditions, which, if neglected, result in the collapse of the building; it is limited by the physical properties of material, by the climate, by the habits and necessities of the moment.

Study of æsthetic rules produces fine designs, and study of scientific laws produces fine construction. Construction demands a knowledge of the principles of mathematics, besides a knowledge of the properties of building-materials. Now, mathematics involve logic, or the science of reasoning correctly, and hitherto logic has been held to be the peculiar inheritance of man as opposed to woman. It may be freely granted that among uneducated women possibly a larger proportion are more illogical in their every-day conclusions than among an equal number of uneducated men; but it by no means follows from this that the brain of the average woman of education is less capable of mastering the science of logic than that of the average man of education. Now, we are only discussing cultivated women, and all reference to the uncultivated and illogical class is beside the question. That logic can be mastered is proved by the successful results achieved by women at the universities, where they show peculiar aptitude for the science of mathematics, the numbers who devote themselves to this study being great, out of all proportion to those who select other schools or triposes. Again, at the Ecole des Beaux-Arts, where the architectural course includes, besides an immense variety of other subjects, a very high standard of mathematical ability, a woman, an American, has lately had the honor of carrying off the Premier Prix over the heads of her brother-students.

But pure mathematics are of little use without familiarity with the properties of building-materials, and this familiarity, it is argued, can only be gained by a technical knowledge of the trades employed in building. In the Middle Ages the architect was only distinguished from the workman by conspicuous natural gifts and greater skill in

technique; he who was most familiar with his materials produced the finest designs. The workshop was then the training-ground for the embryo architect, and doubtless would have proved a rough school for a woman. But now, however much the fact may be deplored, most of the architect's work is produced in an office, and not in a workshop, and is due more to his intellectual activity than to his manual skill in any trade. If, then, good design depends upon the proper use of material, and this use may only be learned through handling it, how comes it that fine designs are produced by men who are in no way fitted to work with such material, and that, on the other hand, most of the builders who dispense with the services of an architect, and many of whom are skilled in one or more trades, produce crude results which, though they strive after, fail to realize, architectural effect? The answer is simple. It is largely a matter of education and preparation which enables the sharpened intelligence to grasp more readily the principles of technical skill. This general education is indispensable to architectural study, and since there is but slight difference nowadays in the course of education pursued by men and women, I cannot see that the absence of workshop training should nowadays hamper a woman more than it does a man. Do not mistake my meaning. Education cannot create the gift of design, for designers, like poets, are born, not made; but it fosters and encourages this gift and calls out the highest faculties when they do exist in the student. No amount of training will make the deaf and dumb to sing; but, for all that, training is invaluable, not to say essential, to a singer who means to do his voice justice. If I may be allowed a misquotation: —

> Books, gowns, degrees will leave a fool a fool,
> But designs are best when the designer's been to school.

Granted, then, that woman is fully competent as far as the æsthetic and scientific sides of the profession are concerned, there remains the economic side to be considered. This covers all the business transactions that take place between the architect, client and contractor, and involves the exercising of a large amount of tact in order to make matters run smoothly. Without tact a business man will not go far, and this indispensable quality seems universally acknowledged to be dealt out more generously to woman than to man. In France every woman is born a business-man, and her taste is never questioned, whereas in England it is the exception to find a man who combines artistic talents with business qualities.

The stumbling-block in the business relations seems to be that the architect is responsible for the quality of the work done, and so has to oversee and direct the workmen. This, for some reason, is supposed to be beyond the powers of a woman; I am told, it is objected, she cannot use the necessary amount of strong language to keep the workmen up to the mark. But surely there are other ways of enforcing your will than through the medium of unseemly language. There is not one man in twenty who has realized that gentleness may be a force. A man will boast of his want of self-control; he flatters himself that abusive language shows him to be a man of strong character, a master; he would count himself less manly were he less violent, and yet you must confess that some of the gentlest men you know happen to be those who always get their own way and compel people to carry out their wishes whether they will or no. St. Paul's Cathedral, one of the finest examples of Renaissance work we have in England, is a living example of what workmen can produce without the stimulus of abuse. Wren held the "ungodly custom of swearing" in such abhorrence that he posted up an order to the effect that, upon sufficient proof, the clerk-of-works should dismiss any laborer guilty of this crime, and further that "if any master working by task shall not upon admonition reform this profanation among his apprentices, servants and laborers, it shall be construed his fault, and he shall be liable to be censured by the Commissioners." Besides, swearing at one's subordinates is really not as fashionable as it used to be. In the army and the navy, where formerly the slightest order was accompanied by a volley of oaths, the change is strongly marked, and the officer who now so far forgets himself as to swear at his men lays himself open to a severe reprimand from those who are of superior rank to that which he holds.

I think I have touched upon most of the points which might be brought forward as objections to women practising architecture, and I trust we shall all be agreed that the obstacles are more imaginary than real. But there is one other point I ought to refer to before closing, and that is the "new style" some people are clamoring for. Since women began to study architecture it has been suggested that they may supply this pretended want, but as yet there has been little to warrant the conjecture that the fresh inspiration will come from that quarter. Women make intelligent interpreters and passionate disciples, but, to judge from the testimony of bygone centuries, their power stops short at creation. It may be wrong to assume that woman is totally wanting in inventiveness, and it may all be a question of upbringing and training. Hitherto men have always led the way, for the race is to the swift and the battle to the strong, and men have been the swift and the strong since women's upbringing taught them only dependence and reliance, and in no way fostered originality. But nowadays women are expected to think and act for themselves, and this self-dependence and self-reliance may prove to be the generating spark which will rouse to activity the originality and creative power which, for all we know to the contrary, may have long lain dormant within them.

But in any case this want of creative faculty would not hamper a woman architect. Architecture is a logical art, and no change has taken place in it without a very obvious reason, and when no reason can be adduced for original and capricious designs, such productions are grotesque and not architectural. The truest architects are not distinguished for brilliancy of invention so much as for careful attention bestowed on the smallest details of their work, and women, "as a whole," possess the faculty of worrying out details so small that they often are apt to escape the attention of the more comprehensive mind of men.

If I do not stop now you may go away with the impression that I consider women more fitted to practise architecture than men, and nothing could be further from my thoughts. May I, in concluding, repeat what I said at the beginning of my paper, that it is not a question of men *versus* women, but that it is entirely a case of the capacity of the individual?

A FOUNDATION ON QUICKSAND.[1]

MERIDEN lies in a valley between high hills. In the valley, which is claimed by some to be the original bed of the Connecticut River, is a soil which consists of a sandy loam, a little gravel and plenty of quicksand. Most of the buildings in this valley rest on the skin which is found at various depths below the surface, and here the Meriden Gas-light Company bought a 300′ x 500′ meadow-lot adjoining its works on which to erect a new holder. Careful borings were made over a section 120 feet wide by 250 feet long to determine the thickness of the gravel, if any, and its distance below the surface. To the west of this section, and 25 feet distant, runs a shallow brook, 20 to 30 feet wide — shallow except in freshet time. About seventy-five tests were taken, and the result laid out and plotted into curves, so that the most desirable place for the site might be located. The top material was a sandy loam, evidently a silt deposited from the overflow of the brook when in past years it was not so confined; the next, a good gravel, but very thin; below that, a quicksand of unknown depth. At a few points the gravel was found as near as 2 feet from the surface and 2 feet thick, while at the others it was 8.5 deep and only .4 thick, shading off to nothing. The average depth, however, taken from the boring-stations, was 5.5 feet deep and 1.2 feet thick. A boring of 50 feet taken in the centre of the site showed 42 feet of quicksand and still more below.

On such materials it was decided to construct the foundation and erect a steel tank-holder, to be 115 feet in diameter and 103 feet high, holding 700,000 feet of gas in three lifts; the weight of the holder to be 475 tons and the weight of the water to be 8,625 tons, or a total of 9,100 tons.

As the work of excavating progressed and the gravel was exposed, there was found a clearly defined depression diagonally across the pit, as if at some time the brook had flowed that way; for logs and trunks of trees were found together with a quantity of brush. Through this depression the gravel was very thin, and in three places the quicksand was entirely exposed — the first, a space 10′ x 15′; the second, a space 4′ x 12′; the third, a space 3′ x 15′.

Hardly had the whole of the loam been removed when a rain came, followed by a heavy freshet, overflowing the meadow and deluging the pit. When the water had subsided it was pumped out in 8 hours with a 4-inch centrifugal pump and a 7½-horsepower motor, though the water was 10 feet deep in some places. The freshet convinced the Company more than ever that in erecting a holder it would be advisable to make the top of the foundation above high-water mark, which in this case would mean a fill in some spots of 12 feet, with an average of 8 feet, and the steel tank would be 2.5 feet above the level of the meadow.

At this point a difficult problem was confronted. Meriden topographically is on high hills and in a sandy valley; good gravel is a very scarce article. Four miles away, on the line of the railroad, is a large, poor gravel bank, and two miles in another direction is a small, good bank; but with all the teams that could be procured it was not possible to haul the material as fast as it was needed; and it was expensive — $1.00 per yard delivered. It was evident that other and good material must be obtained in large quantities. On the line of the railroad three miles away is a large trap-rock quarry. Refuse in the shape of iron-stone, soft-rock and some dirt is accumulated in large quantities. It was believed this stone would mix well with the material which was on hand and could be purchased after it had been passed through the crusher to a 1½-inch size, at 60 cents per yard delivered and in quantities up to 150 yards per day. About 50 yards of gravel and 50 yards of clean, sharp sand could also be procured each day, and as much ashes from the works as there were teams to put on it.

The question of piling was considered, and by some might seem the only wise plan under the circumstances, but after consulting the leading local builder, who had worked on this quicksand for thirty years and had erected some very heavy factory-buildings on it, it was thought best to put in a combination filling of the above-named materials.

The quicksand is found hard packed and not easily dug, unless water is allowed to mix freely with it. Although the excavation was in places much below the level of the brook, little water was encountered, and quite as much came from the land as from the brook side. By keeping the bare spots well drained the men could work on the quicksand with a degree of ease without sinking in very deep; the less it was disturbed, however, the better off they were. Over

[1] From a paper by Mr. C. A. Learned, read before the New England Association of Gas Engineers.

these bare spots it was decided to lay plank close together lengthways of the holes, and upon these 8 by 10-inch timbers, 8 inches apart, crossways of the holes. The filling between the timbers was of pieces of bricks and old retorts broken up fine, that being the best material at hand just then. One of the bare spots being narrow and long, the surface was covered with large flat stones, the smaller spaces being filled-in with fire-bricks and coarse ashes.

While working at this low level a pump was run night and day; also from these quicksand spots a 4-inch-tile drain was laid to a central point to facilitate drainage and keep the mass from becoming spongy while the tamping was going on and each course of filling was laid.

Until the whole surface approached a level no roller could be used, but everything put in was thoroughly rammed and sprinkled. The layers were about 3 inches thick over the whole surface. When the valleys were evened up a two-horse 4,000-lb. roller was put on, and as the thickness became greater this roller was increased in weight to 6,500 lbs., requiring four horses. When the level of filling had been raised above the natural water-level the pumping was dispensed with over night, allowing the foundation to be saturated, but it was pumped out again in the morning.

Near the centre of the foundation a loose brick well was built up, into which the water ran as the foundation was successively wetted, and from which it was pumped to the brook. There were some high knolls of gravel not over 3 feet under the surface. It was thought at first that the 5-foot concrete side-wall foundation might rest on these, but further consideration convinced the Company that this was not advisable, as part of the foundation would rest on natural gravel, while most of it would be on filled ground, so the whole level was raised 1 foot to allow of the same kind of cushion underneath the whole structure before the 5-foot circle was started.

The layers spread each day over a diameter of 125 feet were about as follows: — 125 yards of quarry refuse, 40 yards of good gravel, 50 yards of works' ashes. Towards the end of the work the ashes were exhausted. Near by was a bank of 500 yards of sand, and from this was taken what was needed to make the top-dressing under the concrete, spreading on the stone, washing it in and carefully rolling. Toward the end the roller worked night and day.

Near the edge where the wall of concrete was laid, there was a space that could not be rolled, but had to be filled and tamped to a depth of 4 feet. In order to make sure that this portion was as solid as the centre, a round tapering bar 5 feet long was driven into the main foundation several times. Seventy blows on the average were required to drive it 4.5 feet, and the outside ring was tamped until it equalled the above test.

The amount of material removed approximated 2,900 yards. The work of excavating and filling ready to begin concreting took twenty-two days, and six days more were required to fill-in around the great circle after the concrete wall was 4 feet high. This, however, did not delay the concreters in their work. The filling was as per the following amounts: Quarry stone or refuse, 1,780 yards; gravel, 680 yards; sand, 310 yards; ashes, 1,100 yards; total, 3,870 yards.

On this foundation was laid 630 yards of Portland-cement concrete, in the following proportions: 1 of cement, 2½ of sand and 5 of stone. The size of stone was 1¼ inch and smaller. A great circle of concrete 4 feet wide and 1 foot thick was laid 5 feet below the finished top. On this circle was laid a ring 3 feet wide at the bottom, tapering to 2 feet 9 inches wide at the top, and 3 feet high; resting on the ring was laid, over the whole diameter of 118 feet, a layer 1 foot thick, trued to perfect level and plastered smooth. This work was accomplished in eighteen days, and in a most satisfactory manner, a local engineer taking the job at $4.90 per cubic yard laid. As soon as the foundation was ready the iron-men were on the ground, and the holder was erected complete in a week less than the specified time of four months.

In order to prevent the action of the brook eating away the bank near the holder, a stone wall 7 feet high was built to the level of the holder foundation and 400 feet long, protecting also a new purifier building near the brook. City water was used to fill the tank, as the brook water contained acids. It took three and a half days to fill the tank, which holds a little over 2,000,000 gallons. Before the water was put in careful levels were taken on eight points of the foundations. After filling levels were again taken, and there was not the slightest settlement.

SOCIETIES

THE ARCHITECTURAL LEAGUE OF AMERICA.

THE Fourth Annual Convention of the Architectural League of America will be held at Toronto, Canada, on Thursday, Friday and Saturday May 29, 30 and 31, 1902.

The Architectural Eighteen Club of Toronto, hosts for the occasion, and the various Committees are endeavoring to secure good speakers and to make the occasion profitable and entertaining.

The topics for discussion will follow in the main those of last year, special attention being given to Municipal Improvement, Architectural Education and the various departments of Architectural Club-work.

HUGH M. G. GARDEN, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES CUSTOM-HOUSE AND POST-OFFICE, BRUNSWICK, GA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

PLANS AND SECTION OF THE SAME.

DETAIL OF THE SAME.

[The following named illustration may be found by reference to our advertising pages.]

DOORWAY: PALAZZO BRANCOLI-BUSDRAGHI, LUCCA, ITALY; — DOORWAY: PALAZZO CITTADELLA, LUCCA, ITALY.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

DANGER FROM WOODEN STAGING IN WESTMINSTER ABBEY.

25 CATHERINE ST., NEWPORT, R. I., April 13, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — It is with the greatest distress and the gravest apprehension that I see that loads of timber and lumber are being taken to Westminster Abbey and carried into the building to construct the staging for the coronation. Should fire get into this lumber (a likely event), then Westminster Abbey, one of the most exquisite of Gothic creations, would be lost to the world.

It is easy to see how staging can be made of wrought-iron slats, pinned together through holes punched in them beforehand, with nuts and bolt-heads screwed on to the ends of the pins. Such staging can be made to conform to any arrangement for the seating desired. The floors under the seats can be of boiler-plate, noise from which can be deadened by thick carpets and layers of linoleum. The seats can be the usual cast-iron once common in our theatres, with stuffings of asbestos.

Will not some American firm offer to contract for such staging and send for plans of the arrangement of seats desired? There was a firm (I have forgotten the name) who had an office in the Charities Building on Fourth Avenue near Twenty-second Street, New York. They did work for me on the Colt Memorial Building in Hartford in 1895, and could do such work as this well.

Will not the *American Architect* give a wide publicity to this word of warning? Respectfully yours,

EDWARD T. POTTER, *Architect.*

THE "EXUBERANCE" OF MESSRS. HORGAN & SLATTERY.

NEW YORK, N. Y., April 15, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — We have read with much interest and wish to thank you for your clear exposition of the facts in connection with our employment as architects for the preparation of plans and specifications for the 69th Regiment Armory Building.

We fear that, not having the facts before you, you have unwittingly done us an injustice in your remarks as to the exuberance of the design published in your last issue of the building No. 918 West End Ave., New York. We beg to state that the ornamental lamps, shields, stained-glass, etc., shown on the elevation were not designed by us, but were erected by a Brazilian who became the owner of the building nearly two years subsequent to the completion of the building by us.

We also send photograph of the building, taken when we completed same, and we think you will agree with us it is hardly exuberant in its details. Very truly yours,

HORGAN & SLATTERY.

[THE photograph referred to shows that the exuberant ironmongery was added after the house was completed. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

ELECTRICITY IN EGYPTIAN TEMPLES. — Electricity is to be used in lighting the ancient Egyptian temples of Luxor and Karnak.—*Exchange.*

THE ROLAND PILLARS. — In many parts of Germany one finds in market-towns a rude effigy in stone called Rolandsäule, which is supposed to represent the famous Paladin of Charles the Great. There was one in Berlin which suffered ignominious treatment owing to the changes in taste and is now deeply regretted by the local antiquarians, while a number of the minor towns of Prussia find their old market-statue the most attractive thing to show visitors. Most famous of all is the Rolandsäule at Bremen. The enormous popularity of the versified tales in which Roland figured from the tenth century onward throughout the West of Europe may account for these statues; or, if they were not originally meant as monuments to Roland, may explain the attribution of them to the Paladin. In France a suggestion has been made to erect a memorial to Roland, who was an historical personage named Hruodland, Prefect of Brittany under Charles the Great. He was overwhelmed with the rearguard in 778 by the Basques while retreating from Spain. Hruodland, or Orlando, as the Italians called him, is certainly one of the most famous Frenchmen known to history, about whom a more poetic nimbus has gathered than about Charles the Great or Napoleon. So a fund has been launched in Paris which when large enough is to provide that fair city with a monument to the hero of a thousand songs, epics, plays, a Teutonic general whose character has been invested with traits borrowed from Celtic culture-heroes and ancient Romans of history and romance. The German colossal statues named for Roland in all probability were erected by citizens of certain towns to attract the ignorant, half-pagan rustics, thus affording them a substitute for their old idols, and they were placed at the town-hall or in the market so that bargains might be sealed before them. The Paris Roland will form only one of a thousand statues which attract Christian as well as pagan foreigners to the French capital. — *N. Y. Times.*

IS FORTY-FIVE THE AGE-LIMIT FOR LABOR? — Is it true that employers of labor are discharging employés who have reached the age of forty-five, whether they are capable or not? Do they decline to take on new men who have reached this age? At a meeting of the Chicago Federation of Labor, held a few weeks ago, statements were made that these were existing facts. Members present testified that they had been obliged to dye their hair when it turned gray, to cut off their beards which were becoming white, and leave their spectacles at home, in order to look younger than forty-five, or they could not get a job. The discussion was serious, and some excitement prevailed, so much so that one member sarcastically observed that employers ought to make a law providing for the shooting of all laborers who had reached the age of forty-five. No doubt there is some truth in this. Certain employers may try to get rid of old men and look for young ones, but it is impossible to change the law of nature that a man who is worth his pay, whatever that is, can get work in this country, no matter what his age. If he is twenty-five and incompetent, he cannot keep a job, nor can he at forty-five. If he is active and intelligent, he will in time get what men of the same activity and intelligence command, no matter what his age. The truth probably is that so many workmen of forty-five have lived a hard life and have lost their abilities that they are not worth the money; and employers, seeing the rule, cannot be persuaded to make exceptions. But, after all, the Labor Federation should bear in mind that any resolutions on their part that tend to prescribe whom employers shall employ are, and always will be, unsound, and can only redound to their own injury. — *Harper's Weekly.*

THE RETIRING-AGE FOR WORKMEN. — Every little while a discussion arises as to the time of life when a man ought to retire from active participation in affairs. The public is asked to consider whether there is not a certain limit of years when a man no longer ought to preach, when a rich man ought to begin to give away his money, when a farmer ought to hand over his fields and granaries to his sons and daughters, when an editor ought to stop writing anything but reminiscences which he is pretty sure nobody will read. Out in Minnesota the other day a logging-party, returning from its winter camp, was found to consist of one contractor, aged seventy-eight; another contractor, aged sixty-five; one helper, aged seventy-nine; one horse, aged twenty-three, and another horse, aged twenty-one. They built their own camp, cut their own roads, and piled upon the frozen lake 100,000 feet of pine timber. Further than these bare details the chronicle is silent, but there is enough to show that in the logging-camps of Minnesota the question of the age of retirement is still under debate, or has been indefinitely postponed. — *Exchange.*

GREEK COLUMNS. — So far from employing pedestals to columns, which some have considered as forming as essential a part of an order as the entablature, the Greeks placed their columns immediately on the floor or uppermost step, the whole temple being generally raised on a low platform, to which the ascent was usually by three deep steps or *gradini*, serving as a base to the edifice; the depth of the steps was not accommodated to the human stature, but regulated so as to accord with the dimensions of the column. It is, therefore, conjectured that either a sloping platform of wood or lesser steps of the same material were employed as the real ascent to the temple. The Greeks invariably placed their columns singly, never in pairs, as has frequently been done by modern architects, and which, if not utterly indefensible, ought never to be resorted to unless required by positive necessity: for instance, where wider intercolumns than the scale of the order will properly admit are required, in which case, by affording additional support to the entablature, coupled columns not only excuse the width of the intervals, but take away the air of poverty that would result from single columns placed at the same distance from each other. Coupled columns are most of all offensive when forming a prostyle colonnade, especially if it be one with a pediment, since that disposition approximates so closely to that of the front of an ancient temple as to render any incongruity the more striking. — *The Architect.*

SEQUEL OF THE CHIGI BOTTICELLI SALE. — The suit of the Italian Government against Prince Chigi for having sold his famous Botticelli to Mrs. Gardner, of Boston, has resulted in a manner to make other owners of valuable art-works more careful. The Prince is ordered to buy the picture back or, failing that, to forfeit its value in money to the State. That the Government means to carry out the law forbidding such sales is also shown by the fine of $28,000 imposed upon Enrico Pardo for having sold to a foreigner the Cellini bust of Altovito, formerly in the Altovito Palace in Rome. — *N. Y. Evening Post.*

CURIOUS EFFECT OF CHEMICALS ON SEA-WATER. — While M. Santos-Dumont was inflating the balloon of his No. 6 air-ship at Monaco, he was commanded by the authorities to cease immediately the process of hydrogen-making, on account of the extraordinary effect that the drainage of refuse acids and chemicals into the bay was having on the water, which had turned a brilliant orange, and which it was feared might have an injurious effect on residents near the sea-front, besides poisoning the fish. Subsequent investigations of the curious phenomenon, however, proved that the refuse sulphates running from the Dumont gas-house into the sea had, on contact with the chloride of sodium, or common salt of the ocean, precipitated enormous quantities of oxide of iron. This pure rust had dyed the waters and the shore a most brilliant orange carmine, but except for this no harm was done. Beyond acting as a tonic for the fish, the rust was absolutely innocuous, and the work of inflation was forthwith resumed. — *Scientific American.*

THE EXCAVATIONS AT CARTHAGE. — The Académie des Inscriptions et Belles-Lettres, says the Paris correspondent of *The Times*, has voted 30,000 francs to Father Delattre in order to enable him to continue his excavations on the site of Carthage.

THE USE OF MAGNETITE IN CONCRETE. — A writer in *Nature* points out the advantage that would be gained by the use of magnetic-iron ore as a material for concrete blocks. He points out that if magnetite is used instead of ordinary rock in the shape of fragments, and magnetic sand or ilmenite sand instead of common sea-sand, concrete blocks can be obtained which have all the strength of the ordinary concrete blocks, and which weigh, when immersed in water, exactly twice as much as the ordinary blocks. Such an increase in weight makes the magnetic blocks far superior as regards resistance to the waves. Work constructed with magnetic blocks will stand when other work will be destroyed.

BROCK'S "LORD LEIGHTON" CAST IN BELGIUM. — The recumbent bronze figure of the late Lord Leighton for St. Paul's Cathedral, London, modelled by the sculptor Brock, was cast in Belgium, and the marble pedestal was also fashioned in pieces on the Continent and sent across the Channel to be erected. According to the statement of a member of the Leighton Fund Committee, made to a London paper, "The work could not be done in England; that was why it has been done abroad. Mr. Brock would not intrust a work of this importance to English founders. Any one who knows anything about such things is aware that this is why such work goes to Belgium." The explanation is received with no little dismay in London. Certainly, it would not be true of the United States. — *N. Y. Times.*

CANONS' STALLS FOR WESTMINSTER CATHEDRAL. — The luck of Cardinal Vaughan in the building of his cathedral seems to extend even to details. His fifty-four canons' stalls, which formerly stood in the Monastery Church of St. Urban, near Lucerne, will be the finest of their kind in London. The late Lord Kinnoull bought them in 1866 and bore them to Dapplin in forty trucks. One tires of toys, especially of toys of that size, and the present Lord Kinnoull, willing to clear out his stalls, fixed as their price the modest sum of £4,000. Cardinal Vaughan saw, and was delighted with what he saw, but did not think he could seat his canons so expensively. Then the usual benefactor stepped forward just in time, put down his check, and presented the carved furniture to the hesitating but not lost Cardinal. — *London Chronicle.*

THE LIGHTNING-ROD QUESTION. — The vexed lightning-rod question is now under consideration of the Special Lightning Research Committee which was organized last year by the Royal Institute of British Architects' and the Surveyors' Institution. More than 200 competent observers have been appointed in the United Kingdom, the Colonies, India, and elsewhere. The British War Office, the Home Office, the Post-office, the Trinity House Corporation, and the United States Department of Agriculture have agreed to furnish the Committee with particulars of damage resulting from lightning-stroke to buildings under their control. The heavy thunder-storms of last year afforded many opportunities of investigating and recording, upon prescribed lines, the damage caused by lightning. The net result, so far, is a series of seventy or more trustworthy records, which furnish promising material for the Committee to work upon, with the view of formulating conclusions. The Committee have arranged for getting photographs immediately after the occurrence of a disaster in cases of importance. Out of sixty cases tabulated up to the end of December, no fewer than twelve relate to buildings fitted with some form of lightning-conductor. As regards the system recommended by the Lightning-rod Conference of 1882, the facts at hand are not sufficient to determine the extent of its efficacy. The recently issued report, however, of the British Inspectors of Explosives goes to show that it has been found wanting, and that there is ample justification for the present inquiry. The head of the Committee is Mr. John Slater, the eminent architect, and among his associates are Dr. Oliver Lodge, W. P. Goulding, Major-General Festing, and other well-known scientists. — *N. Y. Evening Post.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, APRIL 26, 1902 No. 1374

CONTENTS

SUMMARY: —
The Approaching Movement in Real Estate. — Proposed Whitewood Trust. — The Laboring Man's Interest in "Trust" Prices. — A Tariff Tax levied on the Gift to this Country of a Statue of Admiral Rochambeau. — Similar Fate of a Collection of La Fayette Relics intended for the Congressional Library. — Dissatisfaction with the Result of the Grant Monument Competition. — Death of Jules Dalou, Sculptor. — The Zoölogical Gardens in Berlin. — The Popular Interest in such Collections. — Coming Congress of the History of Art at Innsbrück. — Renewed Life in the British Coal and Iron Trades. 25
DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES. — VII. 27
LETTER FROM CHICAGO. 29
STRUCTURAL COLOR-DECORATION OF THE INTERIOR OF PUBLIC BUILDINGS. — I. 30
ILLUSTRATIONS: —
A Private School-house, Boston, Mass. — The Big Tree Swimming-pool, Cambridge, Mass. — Boat-house in Wade Park, Cleveland, O. — The Great Hall, Hampton Court Palace, England.
XVI-Century Porch, Ronquerolles, Seine-et-Oise, France. . . 32
NOTES AND CLIPPINGS. 32

INDICATIONS point, perhaps more distinctly than ever, to an approaching movement in real estate, which, it may be hoped, will be for the advantage of building-interests. For some years, construction has been, to a great extent, confined to syndicate operations, which have been devoted almost exclusively to office-buildings and apartment-houses. Now, there are evidences that the production of new offices has run rather ahead of the demand; and, except in New York, which seems to have an unlimited market for tenements of all classes, the cost of first-class apartments, and the expense of maintaining them, is so great, and their tenancy so uncertain, that syndicate managers, who look for a sure, rather than a large, income on the investment which they control, look upon them with diminishing favor. Meanwhile, however, the country has for several years been extremely prosperous, so that there is a large amount of money seeking investment; immigration has increased enormously, bringing in, under our present laws, a new population of industrious and thrifty citizens; and these new citizens will soon need houses, and those who sell goods to them will need new stores for their business. All this will bring about a renewed demand for varieties of property which have for several years been neglected, and for new construction in many forms. In fact, rents of dwelling-houses and stores have already advanced slightly, and, even at present rates, they pay much better interest on the investment than the railroad stocks which have doubled in price within the last two or three years. Most experienced bankers think that the prices of the latter have reached their highest point, and the appearance of the seventeen-year grasshopper, or a season of hot winds, might reduce them very materially, while prices of real estate, on the whole, have remained stationary for at least twenty years, and a readjustment of the value of such property to the present population of the country would involve a very large advance. That such readjustment must come sooner or later is certain, and the prices of available land which seemed reasonable when the country had less than forty million inhabitants will appear absurdly low with a population of seventy-five millions. It is true that a great deal of land has been "developed" within the last two or three decades, and that the competition of the newly-developed property has kept down the prices of other land; but development now concerns itself mainly with suburban lands, and the improvement of these will, in the end, add to the value of city property, the area of which is necessarily limited.

A TRUST is said to have been formed to control the output of whitewood, or poplar, as it is called where it is grown. This timber, the wood of the tulip-tree, or liriodendron, is produced only in a limited district, in Tennessee, West Virginia and the neighboring States, and it seems to have been an easy matter to combine the saw-mills of the region under a single management. As usual with trusts, the public is assured that the monopoly will not result in raising the prices of whitewood lumber, but is intended only to secure profitable and economical use of the waste matters from the mills. Whether these reassuring statements will be confirmed by experience remains to be seen, but the poor owners and tenants of houses, who have seen the prices of framing and flooring lumber, protected by a heavy duty against the competition of Canadian forests, nearly doubled within a few years, and those of hardware, glass and metalwork, controlled by trusts under the protection of the tariff, more than doubled, are not likely to put much faith in them.

IF the poor workingmen, and people dependent upon salaries, had their incomes doubled, to correspond with the advance in trust prices, they might not complain, but this is far from being the case, and it does not require a profound intellect to see that every dollar of the annual dividends of one hundred and forty per cent on the real capital of trust corporations, and of the enormous incomes of the financiers who manage them, comes out of the pockets of the great mass of modest and uncomplaining people, who can do nothing but submit to what they cannot prevent. The latest trust, that controlling food products, has excited more indignation than any other, but the protective duties on which it depends for shutting out the competition of Canadian eggs, butter and other provisions are low in comparison with those on other goods, and the tenant of a New York flat has probably paid more indirectly every year for a long period, in his rent, as his contribution to the tinplate trust, the glass trust, the hardware trust, the iron trust and a dozen other trusts, than he will this year directly to the beef trust in the increased prices of the food which his family consumes.

THE delights of the tariff continue to occupy a considerable portion of the attention of the public. By the generosity of friends of the United States in France, a statue of Admiral Rochambeau has been made, for presentation to the Government, as an ornament of the city of Washington. Considering the important share which our French allies had in bringing about the success of our Revolution, and the pleasure which all Frenchmen take in recalling their participation in the struggle which gave birth to the great Republic, the gift of the Rochambeau statue was a particularly graceful and significant international compliment, and it was with mingled feelings, in which, we may suppose, admiration for American courtesy did not form a very large ingredient, that the officials of the French Embassy learned that a duty of thirty-five hundred dollars would be levied upon the statue on its arrival in New York. On application to the Treasury authorities, the French officials were kindly informed that some one would have to pay the duty on the arrival of the statue, and that, afterwards, by petitioning Congress to pass an act of reimbursement, he might possibly, some time, get his money back. As volunteers for the duty of paying thirty-five hundred dollars to the intended beneficiary of the gift, to induce him to accept it, do not seem to have offered themselves, the prospect is that the Rochambeau statue, on reaching its destination, will either be seized and forfeited, or will be consigned to the appraisers' stores, there to remain until its turn comes to be sold at auction as old junk.

A STILL more chilling reception has been given to the La Fayette relics, collected with great trouble and expense by the American Ambassador to France, for presentation to the Congressional Library. The money required for the purpose, amounting to a very large sum, was contributed jointly by Mr. J. Pierpont Morgan and Mr. Levi P. Morton, and the collection would have been, probably, the most valuable historical treasure in the country. In fact, the custom-house officials in New York were so impressed with its value that they immediately levied a duty of forty thousand dollars on it. Whether Messrs. Morgan and Morton paid the duty, as the penalty for trying to do a good deed to their fellow-citizens, or whether the La Fayette relics were confiscated, or sent to the appraisers' stores as old junk, we are not informed, but it is, at least, safe to remark that it is not under such conditions as these that a country becomes rapidly enriched with historical and artistic treasures.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

THE award of the jury in the competition for the Grant statue in Washington does not seem to give universal satisfaction. The first place was awarded to the model of Henry Merwin Shrady, of New York, a young and comparatively unknown sculptor, while the second place was given to Mr. Niehaus, one of the most distinguished of American artists. Whether the jury could not quite make up its mind that it preferred Mr. Shrady's model, or whether it thought that Mr. Niehaus ought really to have another chance, does not appear, but it recommended that a second competition should be held between these two artists. Mr. Niehaus, very honorably, declined to engage in a second competition, so that the work is likely to be awarded to Mr. Shrady, whose friends, while they rejoice at his success, regard as an undeserved and unnecessary discourtesy the suggestion that he should be obliged to compete again for the prize which he had already won in strict compliance with the terms of the programme.

FRANCE has lost a great artist in the sculptor, Jules Dalou, who died recently in Paris, at the age of sixty-four. Dalou was a Parisian by birth, and was educated at the School of Fine-Arts. Like so many other young artists of the time, he interested himself on the side of the Commune during the sad days of 1870, and held office for a time under it. In consequence of this, although it does not appear that he was ever charged with any of the crimes which were expiated at Satory, he felt himself obliged, on the recapture of Paris by the Versaillists, to make his escape to England, where he lived for many years. He returned, however, to Paris twenty or twenty-five years ago, and was welcomed as his talents deserved. He was almost immediately employed to carry out the magnificent group in the Place de la République which would alone secure to any sculptor immortal fame, and, for the rest of his life, was actively engaged in important commissions. Although, among the great artists who have made the French sculpture of the last portion of the nineteenth century famous, there are, perhaps, some whose talent is more sympathetic, none have shown more fire and nobility of spirit than Dalou, and the world will long keep him in grateful remembrance.

THE *Deutsche Bauzeitung* gives some interesting plans and half-tone pictures of the new buildings in the Zoölogical Garden at Berlin. The buildings are by architects of the highest reputation, and are carried out with a freedom and wealth of resource which are rarely seen in modern work. In the elephant-house, for example, by Messrs. Ende & Böckmann, the building, rather simple in plan, has its two entrances accentuated by domes, or, rather, lofty roofs of curved outline, which are covered, apparently with enamelled tiles, in such a way as to form patterns, suggesting, more or less closely, winged serpents, dragons and elephants, arranged in panels, with a background suggesting a Turkish rug. The effect of this novel ornamentation, so far as can be judged from the photographs, is solid and architectural, as well as extremely interesting, and we are disposed to say that it furnishes a signal example of the advantage which architectural design can almost always derive, in difficult situations, by turning to nature for suggestions. Another pretty building, the antelope-house, also by Messrs. Ende & Böckmann, is treated with a similar mixture of architectural and natural forms, but less boldly, and with a success less conspicuous. One can hardly avoid comparing these remarkably interesting buildings with the temporary structures of the Paris Exposition. Although the latter were only intended for six months' use, while those in Berlin are permanent, both were purposely designed to express a certain festive gayety. In both, the outlines were broken, to attract attention, and the detail was studied to amuse as well as interest; but, notwithstanding the beautiful relief-work which was used in profusion in Paris, and the masterly way in which the masses were arranged and subordinated, the temporary buildings of the Exposition, with certain exceptions, unquestionably failed to interest the general public. Architects in Paris, recognizing this fact, account for it by saying that the public did not appreciate the distinction which the profession would naturally make between a temporary and a permanent structure; and, comparing the buildings in plaster and staff with those of stone, found extravagance and frivolity where an architect would see only a gayety suited to the occasion; but the Berlin buildings, although they arrest the attention more effectively than those in Paris, do not, in spite of their gay colors, give the least impression of frivolity. This great merit seems to us to be due mainly to the use of natural forms, on a large scale, as the basis of the decoration, in place of mere bizarre combinations of architectural elements; and we hope that the lesson will not be lost upon the architects of other places besides Berlin.

CONSIDERING how poor this country is in the zoölogical gardens which form one of the most attractive features of nearly every important city on the Continent, it is interesting to note the figures which the *Deutsche Bauzeitung* gives of the financial features of the establishment at Berlin. Like the magnificent Zoölogical Gardens in London, and, if we are not mistaken, the smaller, but very beautiful and interesting ones at Amsterdam and Frankfort, that at Berlin is a private enterprise, carried out and maintained by an association of amateurs of natural history. This association has two thousand members, who are stockholders in the enterprise, and who, with their families, have free admission to the Garden at all times. Besides the stockholders, there are three thousand subscribing members, who pay a certain sum annually, and also enjoy, with their families, the free use of the Garden. These two classes of members make ample use of their privilege, the average number of admissions on stockholders' and subscribers' tickets alone varying from five to ten thousand a day. Besides these, from three to four thousand people per day pay the full admission-price, of one mark, or twenty-four cents, while some two thousand more come at seven o'clock in the evening, at half-price, to listen to the open-air concerts which are given through the summer. On certain Sunday afternoons, also, known as the "cheap Sundays," the price of admission is reduced to six cents, and on these days there are often one hundred thousand people in the grounds. The financial management of the Association seems to be particularly good, for the shares sell at a large premium, a new issue of stock, made for the purpose of raising money for the recent improvements, having been immediately taken up, at thirty per cent advance over the par value. As a part of the money raised in this way is to be used in constructing buildings suited to winter entertainments, a concert-hall capable of accommodating ten thousand people being one of them, it may be presumed that the additional capital will earn a large interest, by drawing to the Garden in cold or rainy weather at least a portion of the people who have hitherto visited it only on pleasant days in summer.

THE beautiful little city of Innsbrück, the capital of Austrian Tyrol, encircled with lofty mountains, is to be the scene next September of an international Congress of the History of Art. The last Congress of the kind was held in Lübeck two years ago, and, before adjourning, unanimously chose Innsbrück as the next meeting-place. For many reasons, it would have been difficult to make a better choice. Not only does the little Tyrolese city have a September climate which is very near perfection, but it is plentifully provided with excellent hotels, which are filled with tourists earlier in the season, but, in September, are likely to have room enough for the members of the Congress. Moreover, lying, as it does, at the intersection of the great Brenner route between Germany and Italy, and the equally important Arlberg route, which connects France, and Western Europe generally, with Vienna, the Danube provinces and Constantinople, it is, and has been for ages, a sort of meeting-place for Northern and Southern, Eastern and Western art. For the purposes of this Congress, the fact that Verona, Venice, Munich, Vienna, Paris, Dresden and Berlin are all within a few hours' ride will do much to make the membership, as well as the exhibits which it is hoped to collect, peculiarly cosmopolitan. The Congress will open September 9, and continue four days. Persons wishing for further information should write to Prof. Dr. Hans Semper, Innsbrück, Austria. Notices of intention to participate in the Congress will be received until August 1, at the same address.

THE cessation of the exportation of American iron to Europe has been followed by a revival of business, and the raising of prices, in all the European markets. In England, particularly, a great deal of iron is now sold for exportation, much of it coming, it is said, to the United States, notwithstanding the enormous duty. Even coal, although the competition of West Virginia and Canadian coal continues, is rising in price in England, a sign of the general revival of manufacturing in that country.

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES.[1]—VII.

TUDOR PERIOD.

THE style of architecture commonly called Tudor extended through the reigns of the Tudor Kings, Henry VII, Henry VIII, Edward VI, Mary and Elizabeth; from 1485 to 1603.

Under the Tudors there came a change over the spirit of the government of the country; the tendency was to make the King all-powerful for the better maintenance of law and order and the more efficient control of the nobles. War, the headsman's axe, attainder and forfeiture had thinned and broken the old nobility, and every effort was made to extort money from and crush those that remained.

Henry VII erected the celebrated monumental chapel, known by his name, at Westminster, one of the leading landmarks of the period, in which he was ultimately entombed. He fostered the arts, inviting sculptors and other artists to come over from Italy, where the great "revival of letters" was already fully established.[2] Saint Peter's at Rome was at that time under construction by Bramante, who was succeeded by Michael Angelo, Raphael and others, contemporaries of the Tudor Kings. Thus at this time were sown the seeds of that great change of taste and feeling that at a later period led to the decadence of mediæval architecture in England, and the revival of the still more ancient arts of Greece and Rome that, flourishing long antecedent to the Christian era, culminated in the splendors of Rome during the Augustan age.

Henry VIII was a man of intellectual training, a good scholar, skilled in music and fully capable of entering into and appreciating the new learning and culture of the age. He was also in his younger days a thorough master of the national weapon, the bow, and was perfect in all those knightly exercises with sword and lance that men deemed the necessary accomplishments of the gentleman of the period. It was during this reign that Francis I inaugurated the era of regal magnificence in France, the days of the "Field of the Cloth of Gold." It was during this time that such buildings of world-wide reputation were erected as the châteaux of Blois, Chambord and Fontainebleau, the Louvre and many others in France, and Heidelberg, on the Rhine.

Haddon Hall: The Entrance.

Cardinal Wolsey, Archbishop of York and Chancellor of England, was one of the leading men of the time, building Hampton Court, on the Thames, one of the most typical works of the period, Barnboro Hall, near Doncaster, and others.

Henry VIII undertook to reform the, so-called, ecclesiastical abuses of the Church; he terminated the payment of tribute to Rome, which had been regularly subscribed by England since the time of King John in 1213, and he declared himself "Supreme head of the Church of England," denial of which was made "high treason." This act caused many notable persons, like Sir Thomas More, to suffer death under the headsman's axe, with attainder and confiscation of their estates. By his dealings with the Church Henry became, incidentally, the leading agent of the "Reformation," a movement that in its inception was more political than religious, the mass of the people being more opposed to the ecclesiastical *power* than to the doctrines of the Church of Rome. The partisans of the movement quickly became parties in the State, those adhering to the reformed church being recognized as "Protestants," those adhering to the Pope as "Roman Catholics," Romanists or Papists.

In 1536, in conformity with this policy, the smaller monasteries were dissolved by Act of Parliament, and three years later the confiscation and destruction of the larger houses commenced, and many famous shrines and relics were ruthlessly destroyed. Of the vast wealth thus thrown into the King's hands part went to found new bishopries, part to fortify the coast; but much more was distributed in lavish grants of estate to favorite courtiers, and many of the abbey churches and buildings were actually dismantled by their new owners for the sake of the lead on their roofs. Thus the glorious monuments of mediæval architecture in England were despoiled and given over to decay; but even in their ruins they are the pride of the land.

It was in times like these that the estates of the loyal Barons were rapidly extended in area. Those of the Duke of Northumberland may be cited as a typical example, owning, as he does at the present time, over 200,000 acres of land yielding a rent-roll of $900,000 per annum. His estates stretch across the north of England from sea to sea and he can ride 100 miles across without leaving his own demesne.

In King Edward VI's time many old foundations were revived and reëndowed, like the "Blue Coat School," Charter House, St. Bartholomew's Hospital, etc., in London, and grammar-schools were erected all over England, many of which remain to the present time, as at King's Norton, Worcestershire, the lower story of which is brick and stone and the upper portions in half-timber with the characteristic open-timber roof of the period.

With Elizabeth came calmer days, after the martyrs' fires in Smithfield under Mary. These were the times of the splendors of Kenilworth Castle, so graphically described by Sir Walter Scott; the times of Sir Walter Raleigh, who founded the Colony of Virginia and introduced into England the smoking of tobacco and the culture of the potato.

This was the time, too, of Sir Francis Drake, the great explorer, the "merchant adventurer," who held that to spoil and burn the Spanish settlements on the shores of the New World, or to capture and put them to ransom, and to waylay the Spanish galleons, laden with gold and silver from the mines of Mexico, were acts, not only most profitable, but really meritorious and virtuous proceedings. The struggles with Spain, culminating in the defeat of the Spanish Armada in 1588, were sequels to these events.

William Shakespeare is another celebrity of this period whose birthplace still remains, an example of the village architecture of the time that is visited by about 30,000 people annually.

"Monopolies" took their rise in these times, and among their number was the "Charter of Privileges" granted in 1600 to the recently formed "Company of London Merchants trading in the East Indies." Thus was founded the famous "East India Company" from which has developed the present British Empire in India. These salient historic facts are laid before the reader to associate in his mind the then prevailing style of building known as "Tudor" with the political and social state of the country; that the ear-marks so easily recognized on the domestic buildings of the period may, as an open book, reveal the life and manners of the people by whom they were erected.

With the close of the Perpendicular period at the end of the fifteenth century, the erection of ecclesiastical buildings ceased in England and domestic building alone occupied the architectural field.

Legal enactments were brought into operation and vigorously enforced, for the suppression of the custom of previous ages of maintaining bodies of military retainers and for the curtailment of the aggressive power of the older nobles. The feudal system had passed away; the days of chivalry were dead. The march of education had taught that violence, conquest and spoliation were not necessarily the only and the highest aims of life. A love of peace, culture and prosperity was abroad in the land. Commercial importance was asserting itself. The accumulation of wealth expended itself on more profuse hospitality; equipages and retinue, though reduced in extent, increased in magnificence and the luxuries of life became more appreciated.

The distribution of the wealth of the monasteries; the spoils of the piratical warfare on Spain and the Netherlands (then under Spanish rule); the new-born trade with the Indies, all tended to accelerate this social development and create the demand for those stately mansions and more modest dwellings that are scattered throughout the land as historic milestones.

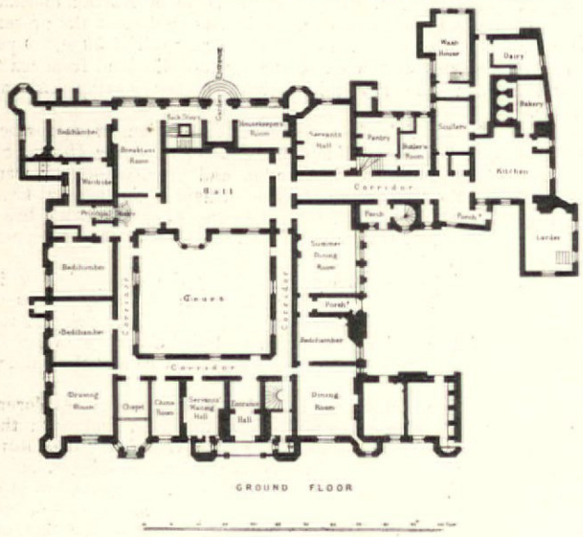
The lay proprietors into whose hands had passed the monastic

[1] Continued from No. 1369, page 94.

[2] Among these was Torregiano, a fellow-worker with Michael Angelo, who, in retaliation for a sneering remark by the latter, struck him in the face, breaking his nose and disfiguring him for life.

estates at their confiscation, either by gift or purchase, found themselves, *ipso facto*, the possessors of the churches incident to the numerous parishes included in these estates. They became, in fact, "lay-rectors," an altogether new element in the State.

These churches had beforetime been served from the monasteries

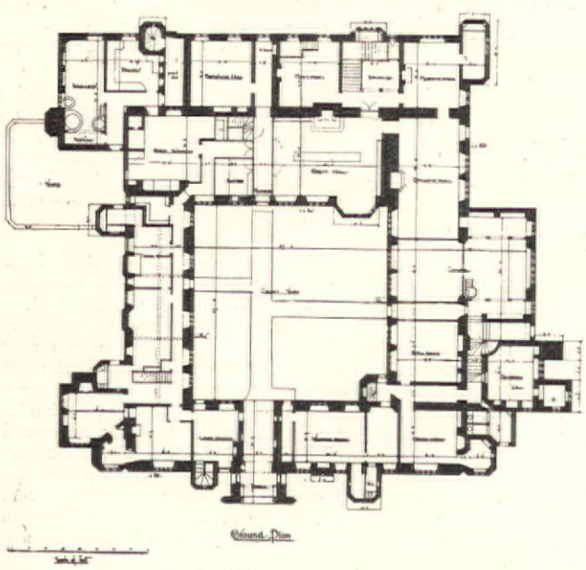


Hengrave Hall, Suffolk.

which collected the tythes and dues. These lay proprietors continued to collect the rectorial dues as part of the income pertaining to the estate and relegated their religious obligations to a deputy or vicar to whom they paid a fixed stipend. Hence, we find the many new vicarages, parsonages and granges of that period erected contiguous to the churches of earlier date.

Then again with this "dissolution of the monasteries" there came a great change in the agricultural class. This enormous acreage of land, more or less under cultivation, yielding an annual rent-roll estimated at one million sterling (say $5,000,000) was rapidly thrown upon the market and bought up, at low prices, by any one who had the capital to do so. This "capitalist" class (another new feature of the times) was made up of merchants, tradesmen and the more thrifty of the franklins and yeomen who, finding themselves proprietors of more land than they could cultivate, let it off to others who were able and willing to pay a rent for its use in coin instead of service, a matter of obvious mutual advantage. Thus sprang up a newer landlord class, who lived upon the investment of their savings or accumulated wealth, and the agricultural class, or tenant-farmers, who cultivated the soil. These, too, built themselves dwellings according to their means, in stone, stone and brick or half-timber, many of which remain to this day scattered over the old monastic estates, often forming the nucleus of the hamlets or villages grouped around the churches of still older date.

These social changes, brought about by the great political events of the time, were the moving causes which led to the wonderful



Compton Wyngate, Warwickshire.

building activity of the time, and developed that tendency to the ornate that marked the Domestic Architecture in England during this particular period of the Middle Ages.

The typical house of the period is still surrounded by a moat, but spanned by a permanent bridge, usually of stone, in place of the drawbridge of earlier days. The visitor, on passing beneath the open entrance-archway, finds himself in a quadrangular courtyard, often planted with yew-trees (as at Speke Hall), in the centre of which stands the sundial of quaint design. The house frequently only occupied three sides of the quadrangle, more or less ⊓ shaped in plan, the fourth side being enclosed with a wall, with the gateway in the centre.

Opposite the gateway would be found the entrance, with the great hall to one side of it with its characteristic bay-window of many stories. The hall was entered from a passage formed by an ornamental screen of oak carrying the minstrels' gallery, as at Parham, Hampton Court, etc. Some of these halls had open-timber roofs, as at Hampton Court, Eltham, Hardwicke and Wollaston; others, again, of later date, had flat panelled timber ceilings, as at Rufford, Charter House and Bagully. The great projecting bay-window, furnished with a fixed seat, gave a certain seclusion almost spacious enough for a withdrawing-room. The large open fireplace with its ingle-nook became a centre round which legends and tales of adventure were told over the blazing logs when the storms blew cold without.

The common, or great, hall, which had reached its utmost development and magnificence in the later Perpendicular and Early Tudor periods, began to decline after the time of Henry VIII, the entrance-hall, often of great dignity, and the wainscoted parlor, with its magnificent chimneypiece, taking its place in the newer buildings.

A small hall will be found, entered from the dais end, in which the family dined in private, or when the great hall was cold and draughty in the winter. It was a pleasant place, too, in summer, for it had its bay-window projecting into the garden and its private exit, as at Ordsall.

The ladies' withdrawing-room will be found close at hand. This became a feature of considerable elegance as times progressed, decorated with elaborate plaster ceilings, divided up into panels with

The Inner Court: Houghton Tower, Lancashire.

carved oak beams, the centres of the panels enriched with fruit and flowers, modelled in high-relief, as at Speke Hall, Astley Hall, etc.

In the older houses we found the rooms led mostly one into the other, but, as privacy became more appreciated, passages appeared and developed into corridors. See plan of Compton Wyngate.

The largest apartment on the upper floor was the gallery, an entirely new feature, which may be described as a magnificent amplification of the corridor into a separate state apartment, for the more particular display of works of art and of the family portraits, the pride of ancestry. At Astley Hall this chamber is panelled in oak from floor to ceiling, and the quaint high-backed chairs and carved presses or cabinets still stand against the walls. The most interesting piece of furniture in this room is the ancient massive Shrove-groat table. "Hit him down, Bardolph, like a Shrove-groat shilling," says Shakespeare in alluding to the game that was played upon it. Many of these pieces of panelling and furniture were the spoils of Flanders, France and Scotland during the preceding wars.[1]

The approach to this gallery was by the grand staircase, another feature that at this period developed the most stately proportions, with its boldly carved newels and balusters, its broad and easy treads and spacious landings. These features, which have the distinctive feeling of Italian influence (found in the Roman palaces), gradually became the most marked characteristics of the period.

The bedchambers of the wealthy were furnished in sumptuous style. Queen Elizabeth was fond of comfort and display, as may be gathered from a wardrobe-warrant, dated 1581, at the British Museum. It orders for the Queen's use a bedstead of walnut-tree, richly carved, painted and gilded. The selour, tester and valance were of cloth-of-silver figured with velvet, lined with changeable taffeta and deeply fringed with Venice gold, silver and silk. The curtains were of tapestry, the head-piece of crimson satin edged with passamanque

[1] Many of these old family relics are being used in the houses of the present day, some worked in as hall furniture, over-mantels in dining-rooms and libraries, particularly in new houses erected to replace as residences those of this period, as at Pirton Hall (replacing the old moated grange), Bramingham Shot and others, the works of the author.

of crimson silk and decorated with six plumes containing seven dozen ostrich feathers. The counterpoint was of orange-colored satin, quilted with cut-work of cloths of gold and silver, etc.

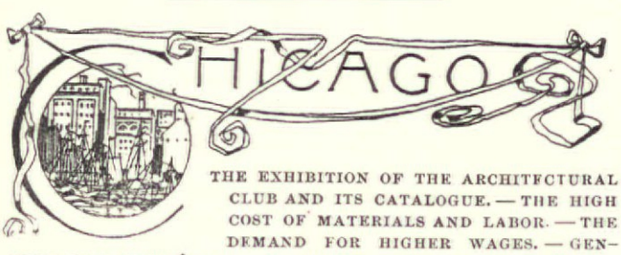
Mention is often made of the priest's rooms; the chaplain not only ministered in religion, but was also the instructor of the youth of the family, the custodian of such library as the owner possessed, and, as we find related in many historical novels dealing with these periods, played no small part in the domestic history of the times.

Another feature we find in the typical house of the period that came more into prominent use in the later Jacobean times is the hiding-places and secret passages in the walls, access to which was obtained by cunningly concealed sliding panels in the wainscoting of the rooms. We find in records of the sixteenth and seventeenth centuries frequent reference to the remains of vaults, passages and secret stairs (as at Woodstock), giving access to concealed chambers secured by gates, heavy doors, etc. A good example may be found in Moreton Hall, where two apartments are entered by a sliding panel, and by a trap-door in the floor fugitives were enabled to escape and reach the farthest parts of the house. It is not surprising that such houses should become the centres around which stories and legends have been woven, and whose panelled chambers and hiding-places should be peopled with the ghosts of departed heroes.

The farm-buildings of these houses stood more or less apart, the barn being the great feature and built with nave and aisles. We also find dairies, stables and provision for falconry, and, particularly in Yorkshire, large stone towers erected for pigeon-cotes, as at Barnboro, near Doncaster.

The greater portion of Haddon Hall is of this period, the chapel and banqueting-hall being earlier (1452), the towers and turrets standing up above the full foliage of summer in picturesque outline. Almost every great English home of this period is memorable and dear to the imagination for the sake of some one person or some one romantic incident, and all Haddon is fragrant with the memory of Dorothy Vernon. We have her postern from which she eloped, her walk, her rooms, her terrace, etc. THOMAS C. SORBY.

[To be continued.]



THE EXHIBITION OF THE ARCHITECTURAL CLUB AND ITS CATALOGUE. — THE HIGH COST OF MATERIALS AND LABOR. — THE DEMAND FOR HIGHER WAGES. — GENERAL SOOY SMITH'S WARNING ABOUT STEEL-SKELETON BUILDINGS. — THE "LAKE-FRONT" QUESTION.

THE Chicago Architectural Club is now holding its annual Exhibition at the Art Institute. The Exhibition fills three or four galleries and is in many ways creditable, though there are some features which are questionable for a general exhibition.

On entering the first large gallery, the most striking design in the room is the large drawing entitled the "Beacon of Progress, a monument," to quote from the catalogue, "typifying the apotheosis of American civilization, to be erected on the site of the World's Fair at Chicago." The statement that it is to be erected is hardly borne out by the facts of the case, though could it be accomplished it certainly would be a very remarkable and imposing production. At the time of the first publication of the drawings here in Chicago, the scheme was commented upon in these letters. The design, made by M. Despradelle, of Boston, both in its detail and entirety, is a very impressive piece of work. One appreciates it to a much greater extent when the original drawings are seen, the details especially bringing out the perfection of its huge proportions. That it ever can be carried out seems more than doubtful, as, for the execution of such a purely monumental piece of work, there would need be a Pharaoh, with his command of millions of both men and money. It, however, should appear as a blessing that the erection of such mammoth toys is now an impossibility; but we are all grown children at heart, as much now as in the days of Assyrian or Egyptian despots, and to the average man such grandeur and size cannot help but appeal.

While the list of exhibitors shows nearly as many outside of Chicago as in, the impression of the Exhibition is that it is given over, not only to Chicago, but to the less-important class of work of the younger men, who chiefly compose the Club membership. In fact, in many ways the exhibits brought most into prominence are of the arts-and-crafts type, rather than the strictly architectural class of designs. Moreover, the few examples of large and serious work that are exhibited seem to have been relegated into the background as much as possible. Nor is there illustrated a single example of the larger work that must of necessity endure long after that of a smaller nature has been forgotten.

Collected under the banner of Mr. Frank L. Wright, doubtless, most of the designs bearing his hall-mark, one of the smaller galleries is given up entirely to his exhibit. From the standpoint of professional ethics it seems questionable whether such a pronounced personal exhibit should have its place in a general architectural exhibition, as it certainly smacks of advertising more than anything else. Having selected one of the small rooms, with a door for entrance and one for exit directly opposite each other, a low partitition is run across from one door to the other, forming a distinct room. The color-scheme of this small division is very charming. Warm light browns and grays are combined, the walls being some brownish burlap banded with strips of some soft-finished wood. The exhibited designs on the walls are all framed to harmonize with the general color-scheme. Brown-leather covers stretch across desks and tables, on which dull copper vases hold effective bunches of gray milkweed pods, brown grasses, teazles, etc. Tall copper and bronze vases in the style of "L'Art Nouveau" hold slender brown seed-cups of some last year's plants; bits of colored and leaded glass, a marble font of good design, a bronze figure, chairs and tables from Mr. Wright's own house, all have a place in this room. This is all very well as far as it goes, and it certainly is *pretty*, almost "too pretty," as Mr. Raffaelli has put it, for such a place as this. Why in an architectural exhibit, the chief one in Chicago for the year, why should Mr. Wright's tables and chairs, and his teazles and milkweeds and pine-branches cover so much space? When one sees the seriously beautiful work, even in domestic architecture, that is being done in other parts of our country, notably in the East, one is ashamed of the trivial spirit that is abroad here among us. There is a set of younger men here in Chicago who foster all this sort of thing. They have among them men with the artistic spirit and feeling, but their aim seems to be always to strive for the semi-grotesque, the catchy. Their compositions lack the best principles of honest design. Their aim seems to be to impress upon the beholder the belief that they are so filled with artistic inspirations and ideas that the flood cannot be held back for a minute, but must be dashed down onto paper as fast as ink or lead can carry it. There *is* a certain dash about it. These men treat the world like one huge studio, but how will these things look, say, even twenty years from now? Like a dusty studio from which the life has gone. There certainly will be no acquired dignity born of time. The designs hardly amount to designs and the execution is usually so extremely cheap that one questions the honesty of the whole thing. Not only in the profession but out of it do people here constantly take this short cut, which they think leads to perfection in art. It is a dangerous thing and one which will hurt the best interests of art and architecture in the section of country where it most flourishes. Originality, tempered with honest endeavor and careful thought and work, gives a fine flavor, one that the more it prevails in a community just so much better is it for that community; but careless self-sufficiency, that is a different thing.

There have been two notably fine houses finished on the North Side in Chicago this year, one a beautiful Colonial on Wellington Avenue, the other an equally good French Renaissance on North State Street. Only one of these houses appears at the Exhibition and that only in one form, somewhat overshadowed in spirit by teazles and pine-branches, and this is the only showing, though they both are unquestionably the strongest examples of domestic architecture here for several years.

The catalogue this year, as in 1901, is quite an imposing affair. On some separate leaves, laid in the book, is the alphabetical list of exhibitors, while the bulk of the book is given over to illustrate selections taken from the material of the exhibit.

While supposedly free from advertisement, and for this purpose published by contributions solicited from architects and others interested in the Club, it must be recognized by nearly every one that this catalogue is nothing but a huge advertisement for a few exhibitors. Aside from all questions of professional ethics on advertising, which the Club committee would have been wise to have considered, it seems decidedly impolitic for the architects themselves to have permitted it. The works of different men are placed in the catalogue in groups in the reproductions of drawings and photographs of actual buildings and details. This is generally done quite unostentatiously, but when Mr. Frank Wright's portion is reached, we are introduced to his fourteen pages with a title-page effect in which is the inscription, "The Work of Frank Lloyd Wright." A Wright chair, vases and the bronze figure, before alluded to, and the usual architectural jetsam compose the material of the title-page composition.

To glance at the catalogue one would think that this "L'Art Nouveau" of ours was the only manner of existence in architecture here, and it is a positive relief to turn to some of Mr. Sullivan's charming designs, a cast-iron grille arc-lamp for one thing, and some beautiful details of his in the large building for Gaga Brothers on Michigan Avenue.

The general building prospects in Chicago are not as bright as they seemed a few months ago. The number of large downtown buildings is considerable, as enumerated in our last letter. The amount spent on each building is, of course, large, and the sum thus spent brings up the total aggregate of money put into building-interest into large figures. This would seem to indicate a greater number of buildings to be erected, or in the process of construction, than there really is. A good deal of work is reported among the factory class of building.

The Parmlee Express Company is about to erect new quarters for itself on the West Side. Plans have just been completed for a three-story stable and wagon-depot to cost in the neighborhood of $200,000. The first story will be devoted to the storage of omnibuses and wagons, the second is for horses, and the third for feed and grain. It is the intention to make it quite a model stable, and the architect, Mr. M. L. Beers, is said to be giving it especial thought.

Comparatively little is being done in domestic architecture directly in the city, and the tendency is all to the suburbs for prominent houses. The North Shore is by far the most attractive suburban section, and a large number of fine residences have been erected through this district the past year.

Evanston, the largest town in this section, has had built a unique little building in its new Domestic Science School, the gift of two public-spirited citizens. It is a one-story building, rather Classic in character, the material used being buff brick and gray stone. The north room is given up to the boys and manual training, while the girls and domestic science fill up the remaining space. The girls' quarters are somewhat picturesque in blue and black, while the boys' training-room makes no pretence at decoration.

It is to be hoped that this spring no serious labor troubles and strikes will arise. The cost of both labor and material is very high, having increased fully thirty-five per cent over what it was six years ago. The demand for workmen of all kinds, whether skilled or unskilled, is very great, and, consequently, builders are compelled to pay wages which appear excessive. It is reported that nearly all the trades in building-lines will ask for an advance this spring. The brick-masons, whose union is especially strong and well organized here, inaugurated the movement, and it is unnecessary to state that other trades have followed their example. The bricklayers have asked for sixty cents an hour after May 1, while the mosaic-tile and encaustic workers will demand the same wages, with thirty-five cents for helpers. According to the agreement made a year ago with the carpenters, their wages have been since the first of April forty-five cents an hour, instead of forty-two and a half. Ordinary laborers are now receiving twenty-five and twenty-eight cents an hour, but after May 1, they will demand thirty.

Periodically, Gen. William Sooy Smith, or some one else, comes along and tells us our sky-scrapers are in danger. General Smith, at a banquet of the Real-estate Board, has warned us that unless the iron and steel used in the construction is properly protected by concrete, corrosion will take place and a collapse of the building follow. Though this sounds like an ominous warning, Chicago goes merrily on, and hopes the steel is protected. General Smith says the attempt to cover steel with perishable paint is worse than useless. "The ordinary corrosion of steel," says General Smith, "takes place at the rate of one one-hundredth of an inch a year where metal is exposed to moisture, wetting and drying. This amounts to one-tenth of an inch in ten years. In the case of a steel column when it corrodes both inside and outside at this rate, the diminution in thickness would be two-tenths, or one-fifth, of an inch in ten years. In twenty years it would be two-fifths of an inch. The columns in our steel buildings would not support the loads they carry safely, with any such diminution in the thickness of their metals. It is not to be feared that the corrosion which actually does take place would reach that amount uniformly over an entire building, but there is a danger, the one to which I allude, resulting from rapid corrosion at one or more vital points in our great steel structures." Several men were interviewed who are connected with firms doing much of the work of the large office-buildings and they seemed to take the warning calmly.

With the opening of spring and with the desire to "tidy-up" every inch of available ground, the ever-recurring question of the Lake-front returns. This time something is going to be done besides talk. Some of the property-owners facing on the tract began to realize that probably not in their life-time would the grand scheme be carried out, which will incorporate the Lake-front into a part of a fine boulevard system. Consequently, money has been raised by these property-owners to the amount of $15,000, and the unsightly tract just north of the Art Institute and south of the present temporary post-office is to be taken in hand. Plans have been made for its future laying-out, and though, as they were published, they did not appear to contain any very unusual features, still even the most commonplace arrangement would be infinitely better than the present mud and cinders.

STRUCTURAL COLOR-DECORATION OF THE INTERIOR OF PUBLIC BUILDINGS.[1] — I.

I THINK that before I presume to say anything on this subject it is due to my audience to offer some explanation as to how I find myself, an architect, in this position. When I was most courteously asked if I would read a paper before the section on this subject, I felt at once that this was really a painter's subject, and that it would be better if a painter — one of those who we know are not only wishing to paint in public buildings, but who are also very capable of performance — should be asked to deal with it. But reflection reminded me that it is an architect's subject too; one common to architects and to painters, one both must be interested in, and one both must have at heart; consequently, though with misgivings as to my capability to say anything worthy of its importance, I could not for a moment refuse on the ground that it had nothing to do with me. It is a subject which by practice, and by study, an architect should try to make his own, and which draws him into close amity with the workers in the other crafts. None gives them better the opportunity of working together, and proving the truth of Stevens's words, "I know but one art." We know how close this union was in the past, and what immortal works it accomplished, and though the association is not now so frequent, there are, at any rate, signs that the ancient sympathy has revived, and is bearing fruit, small the yield perhaps now, but soon, we may hope, an hundredfold. This sympathy, once so full of life, has slept of late, awaking fitfully at times, but ready always to burst out into fullest life when demand is made.

The subject which we are to discuss is a wide one, for it includes the consideration of a large number of building methods, and of various schemes of decoration. It may, I think, be said to embrace those many systems of decoration which by their nature are one with a building, or an actual part of it. It does not include those likewise numerous forms of decoration which are easily removed from the building which they are intended to adorn.

For instance, the Palazzo Pubblico at Siena with its large frescos illustrating good and bad government, intended to instruct the Sienese in that essential matter, comes within our view; but the great council-hall at Venice, on the walls of which are stretched the largest canvases in the world, including the "Paradiso" of Tintoret, however much we may admire them, does not. Nor does the modern council-chamber, poorly decorated with a portrait or two of a former or present mayor, except as a reason for lamentation and hope of change. While, therefore, the subject is a wide one, it has strict limits which it will be necessary to observe.

Perhaps it would be as well for me to define a little more clearly what I consider these limits to be. The title "Structural Color-decoration of the Interior of Public Buildings" makes me at once think of two kinds of public buildings, namely, first, of those which have been constructed of such materials as to carry out a previously conceived scheme of color-decoration; it implies that the floors, the walls and the roofs have been constructed of materials which make up a color-effect.

Then, secondly, I think of those public buildings which, after their completion in the rough, have been decorated in color, in a manner which makes that color one with the materials. Therefore, we may consider our subject in two parts or divisions: —

1. Those buildings whose actual materials form a color-scheme, such, we will say, as the Duomo at Siena.

2. Those buildings which on their completion have been decorated in color in a manner which makes that color one with the materials of the building, such as S. Francesco at Assisi, or the Borgia apartments in the Vatican.

Just as there is no hard or fast rule in art or in her methods, so do these two kinds of decoration overlap, and react upon one another, for, of course, one building may represent both.

It is hardly necessary, perhaps, to define for our purpose a public building. A cathedral, a church, a parliament-house, a town-hall, a meeting-hall, a theatre, a railway-station, all come within our view and open a wide field for consideration, wider, I fear, than the time at our disposal will permit us to consider.

The methods of decoration possible under the two main heads I have named are as various as the types of building I have suggested. The colors of the stone and wood used, fresco, *tempera*, oil-paint, plaster-work, sgraffito, mosaic, tile-work — all have a claim to a place in our thoughts.

Unfortunately, we have to realize that although this wealth of art methods is open to our use, and though we have intimate knowledge of its processes, there are but few public buildings in this country which have any structural color-decoration, and that there is but little demand from the public for works of the kind. It is a remarkable fact that since the sixteenth century in England the practice of decorating in color all our buildings, both public and private, as a natural and expected action, has declined. It is as if our countrymen, who lavished color in cathedral and castle during the centuries preceding the Reformation, had suddenly lost all hearty desire to beautify their buildings in this particular way. We know that England was not behindhand in knowledge of the decorative arts. The remains of the noble craftsmanship in painting and sculpture of the thirteenth and fourteenth centuries go to prove that Englishmen knew how to paint and to carve. The late Professor Middleton has said of English art from 1260 to 1320: —

"The painting of England was unequalled by that of any other country; even in Italy Cimabue and his associates were still laboring in the fetters of Byzantine conventionalism, and produced no works which for jewel-like color and grace of form were quite equal to the painting under Edward the First."

Encouraged by kings such as Henry III, and by the Church, English artists decorated Canterbury, Westminster, Salisbury and countless buildings throughout the land, but the civil wars, the coming of the Renaissance from abroad, the fall of the Church, and the growth of Puritan feeling, seemed to paralyze the development of native decorative art. No Pinturicchio arose here as in Italy, no Raphael to work with the architects in the adornment of public buildings. The Renaissance, instead of adding to our confidence and energy, seemed to condemn us as insular, to be without artistic knowledge, unworthy to paint frescos. Little belief in our powers was shown by those in high places, by those able to commission and encourage. Was sculpture needed, or painting, the artists must come from abroad. Torregiano must make the King's tomb, later Rubens alone can paint the roof at Whitehall, just as Vandyck must paint the portraits. Verrio must paint the ceilings and walls at Hampton Court. Though, through it all, there were English painters, whose works we know, and many art craftsmen, the English artist was eclipsed by the superior skill of the foreigner. With the advent

[1] A paper by Gerald C. Horsley read before the Society of Arts, and published in the *Journal* of the Society.

of Wren, the great English master, we find our countrymen again employed in important work, Streater, in the Sheldonian, at Oxford, and, still later, Sir James Thornhill, at St. Paul's, and at Greenwich.

It has been said that the revival of letters 400 years ago, made it no longer so necessary that the walls of public buildings should furnish a literature for the people, and thus a great incentive to noble, historical and allegorical painting died. Together with the sciences, the painters became learned and conscious. The naïveté of the earlier masters changed to greater care in exactness of representation, but with the old impossibility of the human race to do all things well and perfectly at one and the same time, their works lacked the simplicity and dignity of the earlier period. Architecture thought more of itself and less of the other arts which had previously combined with it to form an organic whole. If she used painting, it was more as a mistress employs a handmaid, and less as an equal coöperating with an equal, and painting apparently would have it so. Instead of covering wall-surfaces with representations of noble deeds by great men, or pictures portraying the mightiness of virtue and the baseness of evil, as in the days of Giotto and Lorrenzetti, she wasted her powers, her perfect knowledge of technique, in extravagant flatteries of her employers, such scenes as we see Rubens painted for Marie de Medicis, the "Apotheosis" of James at Whitehall, and the foolish scene of "Olympus," by Verrio, at Hampton Court. Can we wonder, when we see the purpose of painting reduced to these inanities, that the link uniting her to the great art of architecture would not bear the strain, or that we should have seen, as we have seen, painting and architecture widely separated, the one perfecting herself at the easel, and the other working experiments in the different styles?

We cannot imagine a more half-hearted, or more selfish condition of things, or one more contrary to the spirit of the great days of art. It is, at any rate, to the credit of English architects that they have all along recognized — and with much fulness of late — the harmfulness of the position.

On the other hand, we have also to notice that the Continent has never lost in the same degree as ourselves its interest or delight in the use of color-decoration. Changes not dissimilar to our own have taken place, but the arts of architecture and painting never lost touch one with the other as they did here. In Italy to this day a color-scheme in a new building has a prominent place. In France, a church, a *mairie*, or a theatre, even a railway-station,[1] is not considered complete until it is painted in *tempera* or with canvases, *maroufle*, so that they form part of the building. Such conditions as these may also be found in Germany and Austria. England alone seems, with but few exceptions, to disregard color as a necessary element of beauty in the designs of the interior of her public buildings.

What these exceptions are we may presently consider, but it is time to discuss the two divisions I have just mentioned, particularly with some regard to our work and practice at the present time: *first*, those buildings whose actual materials form a color-scheme. This is a method of decoration which was more in favor with the last generation of art-workers than it is with us at the present day. We are reminded of the buildings of the "Gothic revival," of the works of Butterfield and Street.

These buildings were the result, no doubt, of visits to Italy, where their prototypes may be found, also of a study of our own Gothic period, when a certain amount of parti-colored wall-work was done, brought to us by the mediæval current of art practice from east to west. Modern churches like All Saints', Margaret Street, and Keble College Chapel, by Butterfield, and the church in Garden Street, Vauxhall, by Street, are buildings of this type.

In process of time we seem to have largely passed away from this kind of work; it does not now seem so well worth doing, the results obtained were often cold-looking, harsh and mechanical, owing perhaps to the mathematical accuracy of modern building methods, but there was a principle underlying it all, one of value which cannot be lightly dismissed. We must remember, that when Butterfield did this work it was a great achievement, a launching out into new methods, a deliberate attempt at a human expression in art, and a clean break away from the (to him) cold and formal, dull and vacuous, interiors of 1845. Butterfield, in "All Saints'," has done this, his first essay in the manner, with consummate skill and largeness of feeling, better than at any later time, and better than any of his imitators, and there were many who followed his lead. Few artists ever took such great pains or had such great gifts as William Butterfield. We must not think that he introduced this colored work with the sole intention of breaking-up the appearance of the wall-surface. This was clearly not his main idea. With the "true principles" of the Neo-Gothic architect — and here I think we have the principle underlying so much of this work — his aim was to get a permanent wall-decoration, one which would outlast the usually improperly made plaster wall-covering. He recognized the difficulty and expense of securing any form of painted wall-decoration, also the deleterious effects upon any painted surface of the fumes from gas-lights and oil-lamps, and the evilly-charged atmosphere of London and our great cities. He set himself, therefore, to produce something which was suitable, lasting, and easily kept clean. He did this admirably. Take, for instance, the wall-surface at All Saints', Margaret Street. First, there is a dado of full color some five feet high of tiles; above, large scenes from the New Testament painted on tiles. Above the arches of the nave-arcade the wall-surface is stone, inlaid with bold patterning in tiles and dark inlay. On the east wall only is there any painting. Here are frescos by Dyce in panels spaced between margins of alabaster. The roofs are vaulted and painted in the chancel, and painted wood in the nave. With the exception of the pictures on the east wall there is not a scrap of plaster in the church, and no one will deny that the scheme is interesting and good. In Keble Chapel there is a very similar scheme, but in materials more precious, as befits a college chapel of such importance. Here the lower part of the wall has an arcading of stone, with the spandrels formed of colored bricks. Above, at a height of some 10 feet from the floor, are pictures, the subjects from the sacred history, in mosaic, and framed in stone. The pictures form a large and striking frieze running round the chapel; above it are the windows filled with painted glass, at some height, therefore, from the floor. Between and above the windows are more bands of colored brick. The roof is vaulted, painted to represent stone. Here again, therefore, except in the painted roof, the ground of which I suspect is in well-made plaster, there is no plaster used, and the whole effect is one of great dignity. To our eyes nowadays such a method as this would require to be carried out on the broadest and simplest lines; we should also demand that the materials should be worthy. The black, white, and yellow bricks of fifty years ago have few charms for us now.

The system of alternations of color in a wall-surface, which, no doubt, had its origin — so much as came to us from the East — in the ancient Chaldæan and Egyptian worship of the universe, when by building their temples and pyramids in colored stripes or courses, in due sequence and tints, they commemorated the heavenly spheres, fits in with the natural demand of the eye, which welcomes and recognizes the propriety of variety in color. It is open to us, therefore, to appropriately use the differently colored stones we have, or our own native marble, while, thanks to the discovery and reopening of some of the old Greek and African marble quarries by men of energy and foresight like Mr. Samuel Brindley, of Messrs. Farmer & Brindley, ancient sources of supply are no longer closed to us. So long as we arrange the materials at our hand, be they of clay or stone, with breadth and simplicity, we shall be treating them with the dignity they deserve; and in buildings of importance we shall, I think, be treating ourselves with greater consideration if we invest our patterns with some meaning and intention.

Such principles as these, common to all forms of art, seem to be especially brought into mind when thinking of this form of treatment of a wall-surface. In passing I may point to the Baptistery of Florence, San Miniato at Florence, the Church of the Miracoli at Venice, some late Roman examples at Ravenna, as being particularly successful examples of the use of marble in this connection. The cathedrals of Orvieto and Siena are direct descendants of the striped work of the Saracen builders, a method of building common in the East to this day, and dating, as I have said, from her immemorial past.

Tho second division of our subject — "Those buildings which, on their completion, have been decorated in color in a manner which makes that color one with the materials of the building," offers a larger field for examination. It brings us into touch with the methods employed by our fellow-artists, the painters, and other art-workers, and into notice the conditions which govern the employment of artists in these matters. I ventured to point out just now the different state of things 400 years ago in this country, compared with the present time. How that then nothing was more natural in most communities than a wide employment of painters and workers in the arts in the decoration of public buildings. The history of the past, and the examples remaining to us make this clear. What a contrast presents itself in our own time! Who, for instance, can read the story of the preparations for decorating the Houses of Parliament, fifty or sixty years ago, without amazement and astonishment at the ignorance of, and want of confidence in, the capability of the painters of that time by those in high authority. For some twenty years a Royal Commission was in existence, to consider and decide upon the best means of painting certain panels and rooms in the new Palace of Westminster. They instituted open competitions, invited cartoons, called for samples of painting in fresco. They doled out a few commissions. The expense incurred in preparing for these competitions and trials in painting must have brought many artists to the verge of ruin, and the many delays and slow procedure disheartened and crushed the spirit of all. If anyone wishes to read the sad story of these years, let me refer him to Redgrave's "*Century of Painters*," where the whole history is set forth by one who lived during the time, and knew it well. It may be that the government of our country is too complex and vast an institution to see the advantage of departing from the competition-system, and to trust with commissions artists whose works and capabilities are known, the execution of which would add to the intellectual and artistic output of the country. The few examples we have of such a departure have been signal successes. I may refer, as an instance, to the employment of the late Lord Leighton in the frescos "Arts of War" and "Arts of Peace," at the South Kensington Museum.

Fortunately, the experience of the Houses of Parliament Commission I have referred to has served as a warning throughout the country to municipalities and to individuals; and it has been, no doubt, easier for municipal councils, who have so much power in their hands, to foster and encourage the arts of the country, and with their less cumbrous governing machinery, to avoid the many mistakes it is possible to make in the fit decoration of a building of

[1] The new Gare d'Orleans, at Paris, has two large wall-paintings of "Biarritz" and "The Loire" in the waiting-hall.

importance. This is evident by the conspicuous success which has attended the efforts of some of the municipalities of the country. Manchester is most fortunate in having commissioned Ford Madox Brown to paint the scenes from her history in panels in her Town-hall. Glasgow is employing some of her own sons, Messrs. Henry, Lavery, Walton, and Roche, in her city buildings. The Corporation of Liverpool, acting wisely on the advice of their architect, has commissioned Mr. Charles Furse to paint the pendentives of its large dome, illustrating scenes from the commercial greatness of the city. Birmingham has commissioned some of the students of her Municipal School of Art to paint scenes commemorating her history in panels in the Town-hall. The Corporation of Colchester also, in the new Town-hall, on the advice of their architect, Mr. Belcher, is employing Mr. Charles Baskett to decorate the Council-chamber and Moot-hall, under his supervision and with his assistance. In London, in our own Royal Exchange, the Corporation of the City of London, together with some of the great City Companies, have commissioned artists to paint the panels of the ambulatory.

For some years past the municipalities of our towns have been fostering a love and appreciation for our arts by buying pictures and placing them in suitable galleries. This virtue of acquiring beautiful things has now been supplemented by giving commissions for mural painting. In the placing of these commissions, we have the greatest hope and encouragement for the future, and with the increase of the municipal councils which is taking place in our midst, we may look to see full advantage taken of the opportunities the public buildings present for the employment of artists of proved power and attainment, to the advantage of the people of this country. With this hope in our hearts, we may consider, with greater interest, certain of the methods of work which at the present time are in use.

[To be continued.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

A PRIVATE SCHOOL-HOUSE FOR MR. A. L. K. VOLKMANN, BOSTON, MASS. MR. W. WHITNEY LEWIS, ARCHITECT, BOSTON, MASS.

THE BIG TREE SWIMMING-POOL, CAMBRIDGE, MASS. MR. R. CLIPSTON STURGIS, ARCHITECT, BOSTON, MASS.

BOAT-HOUSE IN WADE PARK, CLEVELAND, O. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

THE GREAT HALL, HAMPTON COURT PALACE, ENGLAND.

THIS illustration is copied from the *Builder*, in connection with the article on the "Domestic Architecture of England," elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

XVI-CENTURY PORCH, RONQUEROLLES, SEINE-ET-OISE, FRANCE.

NOTES AND CLIPPINGS

THE MCCLELLAN STATUE COMPETITION.— Twenty-nine sculptors are said to have signified their intention to submit designs for the statue of General McClellan, which is to be erected in Washington. — *Exchange.*

A VESSEL IN COURSE OF CONSTRUCTION, IS A STRUCTURE. — The question before the Appellate Division of the Supreme Court in the case of Frank Chaffee against the Union Dry Dock Company was whether a vessel in the course of construction in a shipyard is a "structure" within the meaning of that part of the labor-law relating to the duty of the master in erecting scaffolds about buildings in the course of erection. The plaintiff received injuries through the fall of a scaffold built around a vessel on which he was working. A judgment in his favor is affirmed, the Court saying it readily concludes that the vessel in question was a structure within the meaning of the statute. The purpose of the law, the Court says, was to ensure greater protection and security for workmen, and to prevent falls by reason of defective scaffolds. "It was an entirely immaterial circumstance before this general purpose," says Justice Hiscock, "whether the scaffold should happen to be around a house, a barn, a vessel, or a flag-pole. If it fell 40 feet, the man upon it would be injured in one case as readily as in the other, and it was against that injury that the Legislature sought to guard by imposing additional responsibilities upon the employer in favor of the employé. The word 'structure,' measured by its derivation, means something which is arranged, built, or constructed. Bouvier defines it to mean that which is built or constructed. It has been judicially construed, among other things, to include poles planted in the ground and connected together by wires and insulators." — *N. Y. Times.*

AN ANCIENT CITY OF THE ZAPOTECAS DISCOVERED. — Leopoldo Batres, Conservator of Archæological Monuments in Mexico, has exhumed an ancient city of the Zapotecas in the State of Oaxaca. In its centre is a grand plaza, and rising to the north of the plaza are terraces, on which are founded two great temples, while in the centre of the plaza itself are two massive mausoleums in which the priests of the temples were buried. On opposite sides of the public square there are also twelve smaller shrines, six on either hand, all supported by heavy columns of basalt covered with hieroglyphic inscriptions in bas-relief. In the temples the history of the people was found inscribed in the language of the Zapotecas upon fifty tablets of stone. So much of a surprisingly rare historic import has already been found that Mr. Batres will ask the Government for more men to be put to the work of exhuming and restoring the buildings of the long buried city. — *N. Y. Tribune.*

THE SPEED OF UNDERGROUND STREAMS. — A recent and interesting development in the work of the Division of Hydrography of the United States Geological Survey is the study of the flow of water under ground. In many localities the water which finds its way beneath the surface is of considerable economic value, but little has hitherto been known regarding its speed and the manner of its flow. During the last season the Geological Survey has been engaged in a series of preliminary studies under Prof. C. S. Slichter of the University of Wisconsin of the underflow in the sands of the Arkansas River. The method of investigation is entirely new; two test wells are driven and electrically connected. Into the upstream well is placed an electrolyte, or dissolvable substance, which affects the electric current. This electrolyte enters the underground water at the first well and gradually passes down stream to the second. In the electrical circuit between the two wells the needle of an instrument records its approach, and is strongly affected by its final arrival. By watching the increasing deflection of the needle it is possible to trace the movement of the water from the beginning of the experiment and to study the variations of its flow. In the experiments on the Arkansas River the rate of the underflow was found to be from 3 to 15 feet per day. — *N. Y. Evening Post.*

ACETYLENE GENERATORS TEST. — The increasing use of acetylene generators in this country lends interest to the tests lately made by British experts to establish the conditions with which a machine should comply to be passed as safe. The investigation was conducted by officials of the London County Council and other bodies, who determined that all generators should come up to this standard: (1) The temperature in any part of the generator, when run at the maximum rate for which it is designed, for a prolonged period, should not exceed 130 degrees Centigrade. This may be ascertained by placing short lengths of wire, drawn from fusible metal, in those parts of the apparatus in which heat is liable to be generated. (2) The generator should have an efficiency of not less than 90 per cent, which, with carbide yielding 5 cubic feet per pound, would imply a yield of 4.5 cubic feet for each pound of carbide used. (3) The size of the pipes carrying the gas should be proportioned to the maximum rate of generation, so that undue back-pressure from throttling may not occur. (4) The carbide should be completely decomposed in the apparatus, so that lime-sludge discharged from the generator shall not be capable of generating more gas. (5) The pressure in any part of the apparatus, on the generator side of the holder, should not exceed that of 20 inches of water, and on the service side of same, or where no gas-holder is provided, should not exceed that of 5 inches of water. (6) The apparatus should give no tarry or other heavy condensation products from the decomposition of the carbide. (7) In the use of a generator, regard should be had to the danger of stoppage of passage of the gas and resulting increase of pressure which may arise from the freezing of the water. Where freezing may be anticipated, steps should be taken to prevent it. (8) The apparatus should be so constructed that no lime-sludge can gain access to any pipes intended for the passage of gas or circulation of water. (9) The use of glass gauges should be avoided as far as posssble, and, where absolutely necessary, they should be effectively protected against breakage. (10) The air-space in a generator before charging should be as small as possible. (11) The use of copper should be avoided in such parts of the apparatus as are liable to come in contact with acetylene. Adherence to these conditions, with those prescribed by the National Board of Fire-underwriters, is supposed to render the use of gasolene generators absolutely safe. — *Exchange.*

THE PARISH-PRIEST AND THE ARTIST. — A tragedy in the artwork of a painter recently befell a French artist, Henry de Groux, just as he was about to finish the interior of a chapel in a suburb of Paris. The chapel belongs to a monastic order, and his commission was no less than the decoration of the entire circuit of the walls. His subjects were the "Stations of the Cross," "Christ and the Scribes," the "Flight into Egypt," the "Crucifixion," and so on; and he worked hard for a year. Then he felt he must take a vacation for a few days. On his return something seemed to have happened to his mural work, the color-scheme was out, and several scenes had figures and buildings in them he had never dreamed of. At first he thought he was out of his mind, but a careful inspection proved that the trouble lay in the pictures and not his wits. He posted off to the priest of the parish, and got all the explanation he wanted. That worthy had found his pictures lacking in interest, in figures, in color, in snap. So he engaged a house painter and ordered him to put some pyramids in the "Flight into Egypt" for local color, and paint strong, bright gowns on the figures. In the scene on Calvary the burst of light had been painted black in order to give, as the parish-priest supposed, plenty of horror to the tragedy. In a few days he had ruined the work of a year through sheer ignorance and stupidity. — *N. Y. Times.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, MAY 3, 1902 No. 1375

CONTENTS.

SUMMARY: —
Boston School-houses and the Cost of Janitor Service. — The Effect of Desirable Surroundings upon School-children. — The Robinson Travelling-fellowship in Architecture at Harvard University. — Resignation of Professor A. B. Trowbridge of the College of Architecture, Cornell University. — Remodelling the Interior of the White House. — The Washington Grant-Monument Competition Discussion. — Annual Report of the Boston Museum of Fine-Arts. 33
THE AMERICAN VIGNOLA. — VII. 35
SOME REMODELLED COLONIAL CHURCHES. 37
STRUCTURAL COLOR-DECORATION OF THE INTERIOR OF PUBLIC BUILDINGS. — II. 38
ILLUSTRATIONS: —
Some remodelled Colonial Churches: — Congregational Churches at Ware and Williamsburg, Mass., and Marietta, O.: Three Plates.
Clubhouse for the Smith and Wesson Shooting-range, Springfield, Mass. 40
NOTES AND CLIPPINGS. 40

THE Boston newspapers have joined in a chorus of laudation of the recent report of the Committee on School-houses, which strongly advises that the school-buildings erected for the city hereafter should be rigorously plain, outside and inside, using only the simplest materials, put together in the simplest way which will serve the purpose. It is true that the city of Boston needs a large number of new school-houses, and has only a small amount of money available for paying for them; and it is also true that certain school-houses have, in the past, been built and altered at an extravagant expense; but even these considerations do not quite reconcile us to the idea of building barns for young and impressible children to spend the most impressible years of their lives in. A great deal is said now about the extravagant cost of modern city school-houses, and the architects are indirectly blamed for this, as if it was to satisfy their tastes or whims that so much money was spent, but the fact is that nearly all the increased expense of modern school-houses over those of twenty years ago is incurred to carry out the rules of sanitation which are now enforced either by law or by an imperious public opinion. Where, a quarter of a century ago, a hole in the ceiling of a school-room to let the hot, and, presumably, foul air into the roof-space, with a couple of Emerson ventilators to discharge it thence into the atmosphere, were considered ample ventilation, the law of Massachusetts now demands that thirty cubic feet of fresh warm air per minute shall be supplied to every pupil in every public school building, and it is not the fault of the architects that, in order to meet this requirement, which is rigorously enforced by frequent inspections with anemometers and thermometers, steam-boilers, engines, fans, tempering coils, indirect stacks, valves and controlling devices of the most complicated and costly character are necessary, in place of the simple furnace, drawing its air-supply from the rooms, or, at least, from the hall, which sufficed two decades ago. The newspapers comment with wonder on the fact that the janitor service in the present Boston schools costs nearly ten times as much as it did twenty-five years ago; but where the janitor of 1875 simply put a few shovelfuls of coal on his furnace at night, and shook out the ashes in the morning, and swept the rooms once or twice a week, the modern janitor must either have passed an examination and obtained a certificate, as a competent steam-engineer, or must employ a licensed engineer to attend to the fans and engine, and a fireman to feed the boiler, while he makes his hourly rounds through all the rooms in the building, to assure himself that the thermometer in each is neither too high nor too low; that the inlet and outlet registers are open to the requisite extent; that the mixing-valves are working efficiently, and that inlets are so screened as to prevent undue draughts. If he neglects any of these duties, an unexpected visit of the inspectors may result in the loss of his position; and with these, the varying regulation of the water-supply to the plumbing-fixtures, which is now usually placed in the janitor's hands, and the necessary supervision of the sweeping and dusting of the building, the janitor of the modern school-house has his hands tolerably full, without being expected to use the coal-shovel, the oiler, the broom, or the dust-pan, himself.

WE should be very sorry to see any reduction made in these expenses. Large as is the sum paid out annually for the maintenance of our city school-houses, it is returned to the community tenfold in the improved health, both physical and moral, of the school-children of the present day over that of the children of the last generation; and an increased outlay, as, for instance, for baths in school-houses in poor districts, is, as the experience of Boston has shown, richly repaid. In the same way, we would like, notwithstanding the opinion of the Committee on School-houses, to see all new school-buildings designed with at least a little regard to the æsthetic advantage of those who are to occupy them. A little well-designed terra-cotta ornament about the entrance, or some good plaster decoration in the principal rooms, does not add much to the cost of a modern school-building, while the aggregate influence which they exert in arresting the attention of the thousands of children who see them every day, and in giving them perhaps the only glimpse of the higher life that some of them will ever know, is of incalculable value. To us there has always been something touching in the devotion with which the poor, overworked teachers in the public schools manage to find time to care for the plants and flowers which almost universally adorn the windows of class-rooms. It is evident that the teachers feel, perhaps almost unconsciously, the effect of these objects of natural beauty in softening the character of children, and, in relieving, for themselves as well as for their pupils, the depressing monotony of school duties; and the fact that the practice has become so widely spread among city school-teachers, who are often obliged to make a very appreciable sacrifice of their hard-earned money, as well as of time, to keep it up, shows how important they find its effect to be. It seems to us that this indication, like everything else in relation to school-houses which comes from the intelligent and observant persons who spend their lives in the effort to elevate the character of children, ought not to be neglected, and that the school authorities of Boston, who have provided a degree of security and healthfulness in their school-buildings unequalled, perhaps, anywhere else in the world, should recognize also the importance of developing the higher faculties of the young by the resources which only beauty, natural or artistic, can afford. A great deal has been done in Boston, as well as in other Massachusetts cities, by private generosity, in furnishing new school-houses with pictures, casts and other objects of art, to the very great advantage of the pupils. The public is ready to do much more in the same direction, and it is a pity to discourage it by a refusal to recognize art in the school-buildings. Nobody can put much enthusiasm into decorating a barn with statues, and even a modest sacrifice to art in the designing of new buildings, by encouraging people interested to do something to increase their artistic effect, would be well repaid.

THROUGH the generosity of Mr. and Mrs. Nelson Robinson, of New York, a travelling-fellowship in architecture has been established in Harvard University, of the value of one thousand dollars, to be awarded annually to graduates of the School of Architecture who have completed their course with distinction, or who have completed with distinction a post-graduate course of not less than one year. Selection is made from among the candidates by competitive examination, and candidates cease to be eligible on the completion of their twenty-sixth year. The winner of the award is required to spend a year in the study of architecture in Europe, under the direction of the authorities of the Department. The Austin Scholarship, maintained with substantially the same object for some years past, out of the income of the bequest of the late Edward Austin, has been modified, so that, instead of supporting a student in foreign travel, it is now to be devoted to the establishment of three ordinary scholarships in the Architectural Department, each with an income of three hundred dollars, for the assistance of undergraduates in the Department. It will be seen that, by limiting the eligible age to twenty-six years, rather younger material will be drawn upon for the Robinson scholarship than for most of the American travelling-scholarships, which set the limit of age, as a rule, at thirty years, following the limitation of the Paris School of Fine-Arts in relation to candidates for the Prize of Rome. Few men win the Prize of Rome before they have very nearly

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

reached the age-limit, and American travelling-scholarships usually fall to men of a certain maturity, so that the result of sending out younger students from the Harvard School should be watched with interest. It has seemed to us for some years, judging by the designs shown at the annual exhibitions, that the work of the Harvard men often showed, at its best, a finer artistic sense than that exhibited by any other American school of architecture within our knowledge. It is very possible that this comes, at least in part, from the comparative freedom of the Harvard School from the rather overbearing Beaux-Arts influence which is sometimes found elsewhere; and it is also probable that the original material, selected from a community so old in culture and æsthetic sense as that which Harvard University represents is, taken as whole, of a finer fibre than that which is elsewhere drawn upon; but, however all this may be, the experiment of sending young men, whose individuality of talent has been guarded with special care, to study the masterpieces of architectural art at a particularly impressible age, is a most important one. Undoubtedly, many of the Robinson scholars will fall into the usual habits of ignorant criticism of everything that has not the stamp of French or Italian Renaissance, but there will certainly be some who, like the ablest of the French students, are capable of understanding the beauties of Amiens, or Chartres, or Arles, as well as those of the Louvre and the Farnese Palace; and it is on these that the hope of American architecture depends. We saw, not long ago, and, strangely enough, in a report of a lecture by an Englishman, the advice to young architects to begin their designs by considering what sentiment they wished to express in them. This was the first time, so far as we can remember, since the days of Garbutt, that we ever saw architects reminded, as a principle for practical application, that architecture is an art of expression. In the work of the Harvard School, we have seen, as we thought, indications that this principle was not forgotten there; and, if a curriculum which recognizes such a view of the art can be supplemented by an intelligent and well-directed study of the means of architectural expression employed by the greatest artists in the world, the influence of the new scholarship, both on the University and the community in general, will be very great.

PROFESSOR TROWBRIDGE, of the College of Architecture of Cornell University, has resigned his position, his resignation to take effect at the end of the academic year, when he will enter upon the active practice of his profession in New York. Professor Trowbridge came to this country with high honors from the Paris School of Fine-Arts, including the diploma of the French Government, which comparatively few architects, even in France, obtain; and it will be difficult to fill his place at Cornell. Meanwhile, his friends, and the whole profession, which has taken no small pride in his success, will wish him continued good fortune in his new field.

THE plans for remodelling the White House, at Washington, by adding curved wings and other features, seem, happily, to be laid at rest for the present, and some simple changes are to be made in the interior, so as to obtain more family rooms, while the President's business-offices are to be removed to a temporary structure, which will be built south of the White House, near the State Department. The cost of the changes will, it is estimated, not be more than one hundred and fifty thousand dollars, including such decoration as may be necessary, which, by the President's desire, is to be in the simple style prevailing in this country at the period of the original construction of the building. The whole scheme seems to be straightforward and practicable, and will commend itself to those who have been dreading for two or three years the consummation of the plan for making the White House ridiculous by appending to it the curved colonnades, with intercolumniations nearly equal to the height of the shafts, and entablatures held up by complicated framing, which, as the newspapers informed us, had been decided upon.

THE discussion over the competition for the Grant monument, in Washington, while it does no discredit to any one concerned, shows the difficulties which usually attend the proceedings of people who do not know their own mind, or are afraid to express a decided opinion. Without exception, so far as we know, the sculptors who have had anything to say on the subject have shown the utmost good feeling and sense of honor, and it seems to have been the Commission, which, by its hesitation in giving a frank and decisive award, has given good reason for complaint, not only to the two sculptors most interested, but to their fellows, who are earnest in their desire to see artistic competitions in this country put on a respectable basis, and are disappointed that this one, from which so much was expected, should have resulted only in a dubious award, which, like faint praise, is rather an injury than a benefit to the people on whom it is bestowed. The Commission say, in explanation, that, while the model of Mr. Shrady was "brilliant," they did not feel sure of his ability to execute a finished statue with the necessary "nobility and reserved power," and, at the same time, that Mr. Niehaus's work was of such a high order that they thought he ought to have another trial. All this is quite comprehensible, and, indeed, is rather creditable to the conscientiousness of the committee of award; but it may be observed that the terms of competition prepared by the Commission, and followed by the competitors, certainly implied that the models required would be sufficient to demonstrate to the jury the "nobility and reserved power" of the artist; or, at least, to give sufficient indication of the possession of these qualities by the artist to justify the Commission in making the award without reserve. If the Commission wished to be able to institute a subsequent test of "nobility and reserved power" between the competitors, it should have announced a double competition, in the usual form, one for sketches, and a second for large models; but, not having done so, it should have kept to its contract with scrupulous fidelity. We do not fear, as some of the sculptors do, that the disappointments connected with this competition will prevent the submission of similar competitions in future to expert juries; but we regret to see a young and talented sculptor deprived of a portion of the credit which he has fairly won, by the apparent reluctance of the jury to believe in their own award, and we regret equally that Mr. Niehaus, a man whose talent and character are honored throughout the country, should have been placed, entirely against his will, in the position of one endeavoring, or even consenting, to subtract, for his own benefit, from the credit of a preferred competitor.

THE Twenty-sixth Annual Report of the Trustees of the Boston Museum of Fine-Arts is a particularly interesting one. In the first place, the Report gives assurance of the completion of the purchase, by the Museum, of its splendid lot on the Fenway, containing nearly twelve acres of land, surrounded on all sides by parks or streets, none of which is less than eighty feet wide between the building-lines. As it is generally understood that the Museum has sold the lot which it now occupies for nearly two and one-half million dollars, it seems to be sure of suitable accommodations for the future. It ought, however, to be remembered that two millions and a half is by no means an inexhaustible sum for a public building intended for the fine-arts. The Trustees have been wise enough to secure a tract of ground large enough for their needs for many years to come; but the payment for this tract will absorb a considerable portion of the price of the old lot; and, with what remains, it will be possible to complete a building which will contain the present collections, but without much room to spare; and, for future enlargements of the collections, additional buildings will undoubtedly be necessary. Meanwhile, the collections belonging to the Museum seem to be growing at a rate which is surprising, in view of the great and constantly increasing difficulty of obtaining genuine antiquities, or works of art by noted masters. Within the past eight years, the Museum has expended, out of its own funds, more than six hundred thousand dollars in purchasing objects of art which, in all probability, could never have been secured later; and its acquisitions from donations and bequests, although not so easily measured in money value, are probably not less important. It is gratifying to note an apparent increase in the popular favor with which the Museum is regarded, as shown both in the number of paid admissions, and in the amount of donations and subscriptions. The total number of admissions in 1901 fell a little short of that of 1900, owing, undoubtedly, to the progressive transformation of the portion of the city in which the Museum is situated from a residential to a business quarter. With the removal of the Museum to the Fenway, five or six years hence, the number of free admissions is likely to diminish, as the Fenway is, as yet, rather removed from the range of sightseers; but it is almost in the centre of the residential portion of the Metropolitan district, and should attract a much larger number than ever of serious students, who will find the conditions of work in the quiet grounds fronting the Park far more agreeable than in the noisy and crowded Copley Square, with its streams of electric-cars, its hotels, railroad-stations, concert-rooms and shops.

THE AMERICAN VIGNOLA.[1] — VII.

PART I. — THE FIVE ORDERS.

DRAWING.

GENERAL Proportions. — Since the relative size of all the parts, in Vignola's Orders, is fixed, any of them can be drawn out in accordance with these rules, if a single dimension is determined. The width of a Dentil or the length of a Modillion suffices to determine everything else. But the data generally given are either the lower Diameter of a Column, the height of a Column, or the whole height of the Order, with or without a Pedestal.

I. If the lower Diameter is given, the procedure is as follows (90): Divide it in two, draw the axis of the Column, and then divide each half into three equal parts. This gives the scale of sixths. Divide in two the two outer sixths. This gives the upper Diameter of the shaft, which is five-sixths. Lay off upon the axis the height of the Column, by Diameters (7, 8, 9 or 10), and of the Entablature, which is one-fourth the height of the Column. Mark the height of the Base, half a Diameter, or three-sixths, and then that of the Capital, two, three or seven sixths. Divide the total height of the Entablature into 7, 8, 18 or 10 equal parts, according as it is Tuscan, Doric, Ionic or Corinthian, or use halves, quarters or eighths of a Diameter.

Mark, then, the heights of the Architrave, Frieze and Cornice, drawing horizontal lines through the points of division. Then carry up vertically the outer lines of both the upper and the lower Diameters of the Shaft, drawing from the point where the line of the upper Diameter cuts the lower edge of the Cornice a line at 45 degrees to determine the projection of the Cymatium, or that of the Mutule or of the Corona.

Add one-third the height of the Column for the Pedestal. Divide this into three equal parts, taking the upper third of the upper third for the Cap, and the lower two-thirds of the lower third for the Base. Vignola makes the Base of the Pedestal only one-ninth of the height of the Pedestal instead of two-ninths, as here determined. (Figure 90 illustrates this procedure for the Tuscan Order.)

II. If the height of the Column is given, a fourth part of this added at the top gives the height of the Entablature, and a third part added below gives the height of the Pedestal. One seventh, eighth, ninth or tenth of the height of the Column gives the lower diameter of the Shaft (90). The drawing may then be carried forward as above.

III. If the total height of the Order is given, without the Pedestal, a division into five equal parts gives four parts for the Column and one for the Entablature (90).

If there is a Pedestal, and it is of the regular height of one-third the height of the Column, the division of the total height must be into nineteen equal parts, four of which go to the Pedestal, twelve to the Column, and three to the Entablature (91).

The lower Diameter can then be obtained from the height of the Column, and the drawing completed, as above.

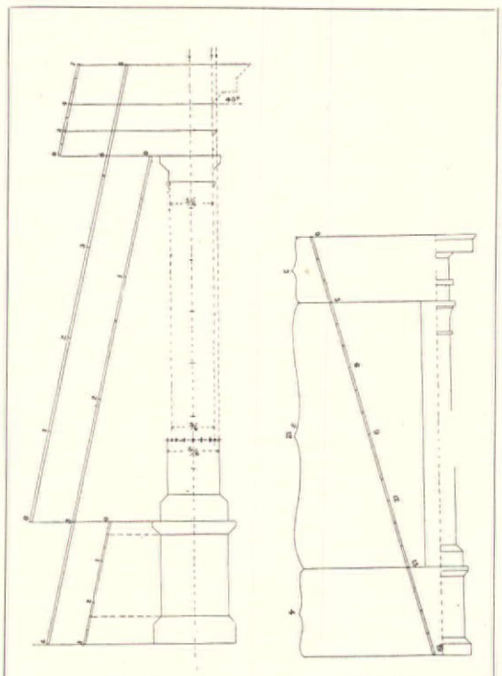


Fig. 90. Fig. 91.

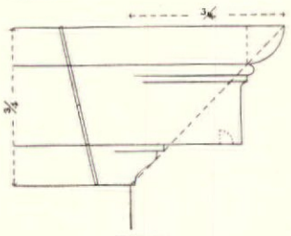
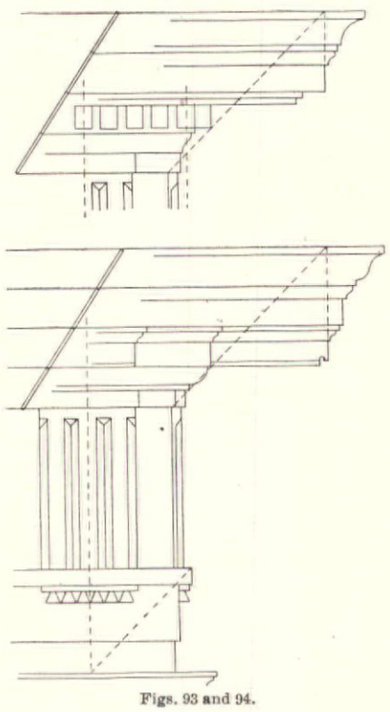


Fig. 92.



Figs. 93 and 94.

Note. — The division of a given dimension into equal parts may be effected with the dividers, or, more easily, by using a scale of equal parts which are the same in number as the desired subdivisions, but a little larger, and holding this scale obliquely between the extreme limits of the space to be divided (90, 91).

The division of vertical dimensions into five, seven, eight, nine, ten, eighteen or nineteen equal parts, as here required, is thus easily accomplished. To ensure accuracy, the lines marking these divisions should be horizontal, not normal to the direction of the scale.

Cornices. — The Tuscan Cornice may be drawn by dividing its height into quarters, as is done in the figure, giving the upper quarter to the Ovolo and the lower to the Bed-mould, and giving the middle half to the Corona, Bead, and Fillet (92). A 45-degree line gives the projection of the Bed-mould, Ovolo, and the Cornice itself.

The Doric Cornice is also divided in four equal parts, the upper one comprising the Cymatium and Fillet, the next the Corona and the small Cyma Reversa above it, the third the Mutules, or the Dentils with the Mutules above them, and the lower one the Bed-mould, including the Cap of the Triglyph, which is narrower in the Mutulary Doric than in the Denticulated, by the width of the Fillet above it (93, 94).

A 45-degree line drawn outward from the middle of the top of the Abacus gives, where it cuts the lower line of the Frieze, the projection of the Tænia. A similar line, where it cuts the upper line of the Frieze, gives the axis of the next Triglyph (84). The Triglyphs are drawn next, with their Cap, and the Regula

[1] Continued from No. 1359, page 12.

and Guttæ, then the Mutules, or the Dentils.

In the Doric Order a line at 45 degrees drawn from the bottom of the Cornice gives the face of the Corona in the Denticulated Doric, the face of the Mutule in the Mutulary; in the other Orders, a similar line gives the projection of the Cymatium (93, 94).

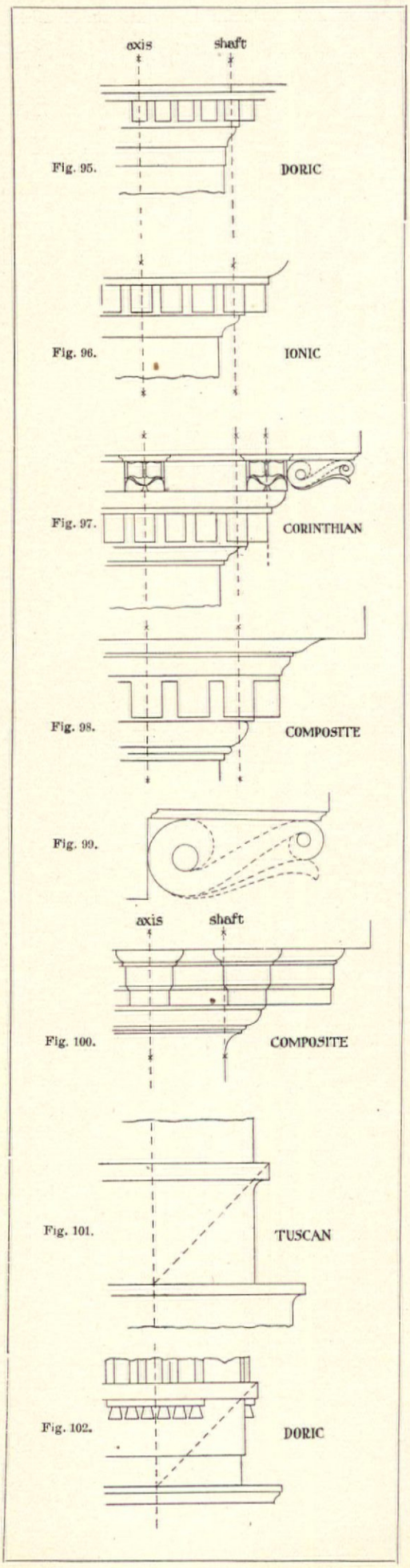
In putting in Dentils, draw first the one over the Axis of the Column, then the Double Dentil, the first half of which is centred over the lower face of the Column, and then the intermediate ones, three, two, or one, according as the Order is Doric, Ionic or Corinthian, or Composite (95, 96, 97, 98). The Interdentil is half the width to the Dentil, except in the Composite.

One Corinthian Modillion comes over the axis of the corner column, and one over the outer face of the Double Dentil (97). In drawing the side of a Modillion, put in first, at the outer end, a semi-circle half its height and one at the inner end nearly the whole height; then the rosettes, one twice as large as the other; then the connecting curves, and finally the leaf beneath (99).

In Palladio's Composite Cornice, one block is set over the axis of the column, and the double block at the corner has its inner face on a line with the face of the Frieze below. The blocks are about half a Diameter o. c., the inter-block being one-twenty-fourth of a Diameter wider than the block itself (100).

Architraves. — The Tuscan Architrave (101) has but one fascia, or band, the Composite two (105), and the Corinthian three (104). The Doric has sometimes one, but generally two (102), and the Ionic has generally two, but sometimes three (103). The lower band is always the narrowest and is set on a line with the face of the Shaft below and of the Frieze above.

All the Architraves have a Cymatium, or crowning member, which in the Tuscan and Doric is a broad Fillet called the Tænia, and in the Ionic and Corinthian is a large Cyma Reversa, surmounted by a Fillet and generally supported by a bead. The lower bands often have, as a Cymatium, a small Cyma Reversa, Bead, or Ovolo, and all three bands are sometimes sloped backward, as in the Entablature of the Palazzo Vendramin-Calergi, at Venice (106), so as to diminish the projection of the crowning mouldings, which generally have a projection, beyond the face of the Frieze, equal to their height.



The Tuscan Tænia has beneath it the characteristic Tuscan congé (101). Beneath the Doric Tænia, and directly under each Triglyph, (102), is a narrow Fillet, which sometimes has a bevelled face, called the Regula, beneath which are the six Guttæ. These are sometimes frustra of cones, as in the Greek Order, sometimes of pyramids. The Guttæ, which almost touch at the bottom, are twice as high as the Regula. Both together are just as high as the Tænia, or one-twelfth of Diameter, so that the three are one-sixth of a Diameter high. They accordingly occupy the upper third of the height of the Architrave, which is three-sixths high, the lower band occupying the lower third.

The two lower bands of the Corinthian Architrave occupy half its height, and the lower band with its Cymatium is just as wide as the mouldings that crown the upper band. The second band with its Cymatium is just as wide as the third band without (104).

Capitals and Bases. — In drawing Capitals, it is best to put in first the axis of the column and the vertical faces of the Shaft; then the horizontal lines, and lastly the profile, beginning at the top. But in drawing Bases it is best to put in the profile of the moulding before the horizontal lines.

The Tuscan Base (107) is half a Diameter high, half of which goes to the Plinth and half to the Base Moulding, which is made to include the Cincture, or broad Fillet at the bottom of the Shaft, which in the other Orders is not counted as part of the Base. But this is merely saying that the Tuscan Base is not quite half a Diameter high.

All the other Bases, including the Attic Base, are just half a Diameter high. All the Plinths are eight-sixths wide and one-sixth high, except the Tuscan and Doric, which are one-quarter of a Diameter high. It is not worth while to define the proportions of the other Bases.

The Tuscan Capital (107) is half a Diameter high, or three-sixths, the upper sixth comprising the Abacus with its Fillet, the middle sixth the Echinus and the Fillet below it, and the lower sixth the Necking. The upper Fillet is a quarter of a sixth wide, the lower one a sixth of a sixth.

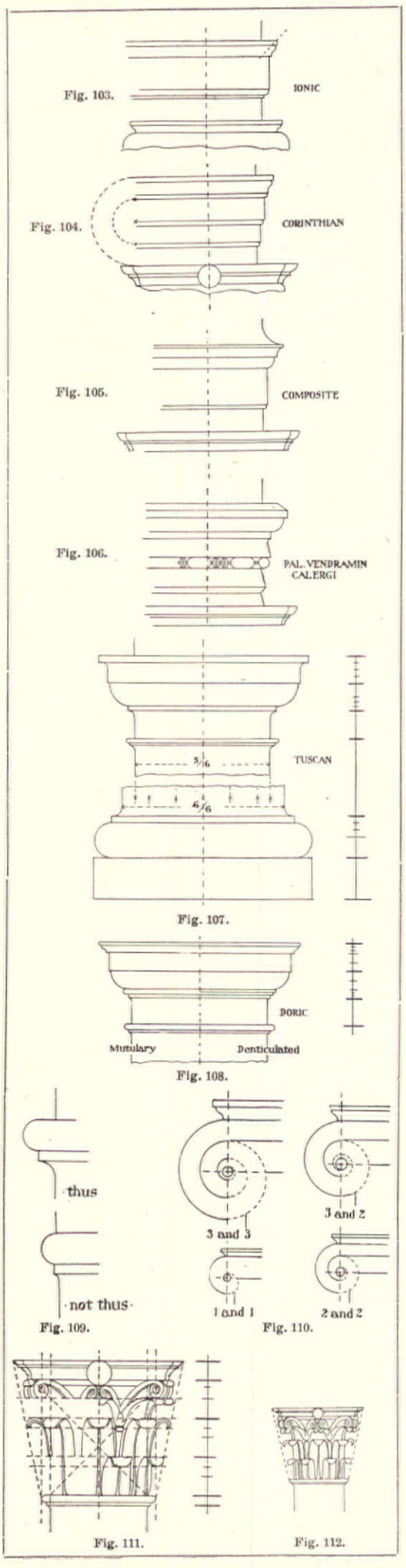
The Doric Capital (108) is also three-sixths of a Diameter high, the two upper sixths being divided into thirds, and these again into thirds, to give the height of the smaller mouldings. The Denticulated Capital generally has three Fillets, the Mutulary, a Bead and Fillet.

The Astragal, which in the other Capitals is $\frac{1}{12}$ D. high, or half a sixth, is in the Tuscan and Doric Orders one-fourth smaller, or $\frac{1}{16}$ D., the Bead being $\frac{1}{24}$ D. high, or a quarter of a sixth. In drawing the Astragals, draw first the horizontal line at the top, which occupies two-thirds of the projection, otherwise the Congé below is apt to be slighted. The Bead and Congé should have their full measure of 180 degrees and 90 degrees (109).

The Ionic Capital, which is one-third of a Diameter in height, or four-twelfths, is also divided into three parts, but unequally. The Abacus occupies the upper twelfth, or one-quarter, and had better be put in first. The Echinus occupies rather more than half of the remaining space, namely five-ninths. In the Composite Capital, the Abacus occupies the upper sixth, and a little more, and the Echinus and the Astragal the next one (98).

The Eyes of the Ionic Scroll come in line with the top of the Astragal and with the lower Diameter of the Column, and should be put in first (110). The Scrolls make three complete turns and finally are tangent to the upper side of the eye. They can best be drawn by putting in first three semicircles on the outer side, and then three smaller ones on the inner side. In working on a small scale, two semicircles on each side suffice, or three on the outer side and two on the inner, as in the plates. But one is never enough (110). The Eyes of the Composite and of the Roman Ionic Capitals are set nearer together.

In drawing a Corinthian Capital (111), it is best to put in first the Astragal and the lower line of the Architrave, carrying up on each side the outer lines of the shaft; then the Abacus, Fleuron and Scrolls. The double scroll at the corner falls just outside these vertical lines. It is slightly elliptical in shape, not circular, and the outer scroll is more elliptical than the inner, being more foreshortened. The small scrolls under the Fleuron are also foreshortened into ellipses. Then the five leaves of second row,



the middle one in elevation, the two side ones in profile, and the other two at 45 degrees, carrying down the mid-ribs to the Astragal. Their tips turn down half a sixth, those of the corner leaves coming just on the outer lines of the upper shaft. Of the four leaves of the lower row, the two inner ones occupy the spaces between these mid-ribs, and the ends that turn over fall entirely within the outline of the lower parts. The two outer leaves extend on either side slightly beyond the width of the shaft below, and their tips fall just outside the lower line of the leaves, being about six-sixths of a Diameter apart. They accordingly come just over the outer lines of the lower Diameter, just as the tips of the corner leaves above them come on the lines of the upper Diameter.

A line drawn tangent to the Astragal and to the Abacus is also tangent in all three rows of leaves, very nearly. The Caulicoli, the Buttons, the third row of leaves, and the lower parts of the Volutes follow, in this order.

The smaller the scale of the drawing, the more straight and upright should the Acanthus leaves be made (112).

W. R. WARE.

[To be continued.]

SOME REMODELLED COLONIAL CHURCHES.

THROUGHOUT that portion of the United States lying east of the Alleghanies, there are a large number of church edifices built during the eighteenth and the early years of the nineteenth centuries, which are still used by religious bodies as houses of worship. A few are of stone, more of brick, but the majority are of wood. Nearly all of them are to be found in that portion of the country comprised by the original thirteen States, and of these, by far the greater number are in New England.

The reason for this distribution is simple. In Massachusetts, there were in 1800, seventy-five inhabitants to the square mile; in Virginia, there were only nine to the square mile. There were not over a half-dozen towns in Virginia with a population of over a thousand. There were forty in Massachusetts.

The prevailing Protestant creeds in New England at that time were Congregational, Baptist and Methodist, all of which leaned rather to segregation of church bodies than to consolidation. The tendency of the leading denominations south of New England, Presbyterian and Episcopalian, ran toward consolidation, so that outside of New England, even in the States with greater

population, the churches were fewer, though often larger and more elaborate.

We are apt to think of the older Southern cities as having to-day more examples of "Colonial" architecture than the Northern, but there are more churches standing in Boston which were there in 1810 than there are in Charleston, S. C., just as there are more old buildings of all descriptions.

In 1810, Charleston had seventeen churches to Boston's twenty-one, and a population of 24,500 to Boston's 33,000. But Boston's proportionately greater increase in population has hidden the older work from sight.

There are few towns of less than 50,000 people in any of the New England States which do not have at least one or more of the typical "old white meeting-houses." Many of them are not a century old, but nearly all, if not all, are of the type broadly classed as the Colonial, and nearly all of wood. In plan, they resemble very closely the more elaborate buildings of stone or brick, of which a few examples are left in the larger cities.

They are pretty thoroughly built as to frame; some of them have held their clapboards and shingles for three-quarters of a century. A few in their detail are elaborate, and generally the detail is good, even in buildings where there is but little.

The preponderance of these wooden churches over those of brick and stone is due mainly to the fact that the congregations of the smaller towns and cities where they were built have not grown as rapidly as in the larger cities. The building of seventy-five or a hundred years ago is still ample for the church society. It is doubtless true, too, that, in proportion to population, there is — or was — a more intense interest in religion in the smaller communities. In 1837, for example, Boston had one church to 1,230 of her population; the town of Bolton, in the same State, had a church to every 280 of her population. It is not surprising, therefore, that the Bolton churches are of wood, nor surprising to find, even though the Bolton ratio may be an extreme one, that the wooden churches outnumber the brick and stone.

Out of this multitude of frame churches, that are still standing, and that are used by religious bodies, there are many which are practically unchanged, save for a few coats of paint, a little more genial atmosphere induced by modern heating methods and modern theology, and a new shingle or clapboard here and there. Others have been transformed externally by Gothic spires and turrets, and "art glass" windows, but remain, as to framework and plan, the same. And it is with the enlargement and renovation of a few of these older churches that this article has to deal.

In the following examples, an endeavor has been made to preserve in the appearance of the buildings as much as possible of the Puritanized Renaissance style, which is the main characteristic of our earlier church-architecture, and, at the same time, provide for the demand, in one instance, for an increased congregation; in the others, for changed methods of church-administration.

It may be noted in passing that all these churches are Congregational, and therefore of the type which, rightly or wrongly, represents in New England the Puritan and Pilgrim spirit.

. . . . . .

Although this article refers to the region east of the Alleghanies as that portion of the country which would be considered, the first of the buildings chosen lies west of the Alleghanies.

Marietta, the oldest city in Ohio, was founded by a body of emigrants from Massachusetts and Connecticut who, under the name of the Ohio Company, and led by General Rufus Putnam, of Connecticut, travelled overland to Pittsburgh, and then by water to the site of the present city. In 1806, eighteen years after the settlement of the town, the Congregational Church, the oldest of the three buildings chosen, was built. Up to 1900, the only change in the building was an addition at the rear to hold the organ, and the cutting off of a portion of the church to form the front vestibule, the original vestibule having been a one-story lean-to, between the towers on the front of the church.

It was the idea of the church society to preserve as much as possible of the old building. The frame was practically sound. The instructions to the architects were to double the seating capacity of the church, make the galleries available, improve, if possible, the exterior appearance of the building, and not spend over $15,000 in the process. The two plans show the relative size of the building before and after alterations. The gallery was dropped about two feet, and the pitch of the gallery floor increased, and by carrying it across the ends of the transepts, it was possible to reach it by staircases from either side of the pulpit platform. At the front of the church, the floor of the old portion was given a slight pitch, but the floor of the new part kept level. On either side of the organ space, there are dressing-rooms and choir-room, and a pastor's room, reached from the main floor of the church and from the landings of the galleries. The old interior finish of the church, which was simple but good, was retained, and the new, so far as possible, is like it.

The exterior of the original church is particularly striking in its two towers. So far as I know, it is the only so-called Colonial church in America which has them.

It has been suggested that French or Spanish influence may have entered into this. It is known that quite a large number of French emigrants settled here in the early years, and there was, of course, some Spanish intercourse from St. Louis by the way of the Ohio River.

It seems more probable, however, that the façade of St. Paul's, in London, may have been in the minds of the builders, or that the two towers are due to the desire to surpass the buildings which the new colonists had left in New England. So far as design and proportion went, the towers were exceedingly bad, and, in fact, the exterior is not nearly so good as the interior, either in its general design or its detail. The door and the window casings of the interior are refined, and evidently studied with a good deal of care, but those on the exterior are crude. It is very surprising, however, that so much detail is present at all when one considers that less than twenty years before the church was built, the nearest town lay several weeks' journey away, through an unbroken wilderness. Marietta was more isolated in 1806 than the smaller towns in New England of 1680.

The second example, the church at Ware, Mass., is changed but very little, so far as the exterior is concerned, the only changes on the front (which is the main architectural feature of the church, as of most Colonial churches) being an elaboration of detail. Instead, the essentials called for were three: More Sunday-school room, more choir and organ space, and a gallery which not only could, but would, be used. These additions have been satisfatorily made from a practical point-of-view. It is a question whether the interior of the church before alteration was not quite as pleasing as it is to-day.

The church at Williamsburg, in Massachusetts, belongs to a later type of architecture, that of the Greek revival, but it was so poverty-stricken in its carrying out that it seemed hardly necessary to keep closely to the original type. The extra room called for here was needed in the form of two parlors and a larger Sunday-school room, and the limitations of the site left only the front of the church available for an addition, as the rear of the church came close to a steep ledge at the foot of the hill. The fact that these smaller rooms necessitated numerous windows influenced the decision as to the style of architecture, for it seemed that the older Colonial work, with its lighter detail, would harmonize better than the later type of the original church.

In all three of these examples the problem has been to reconcile three factors: Sentiment, economy and practical necessity. They don't harmonize perfectly, perhaps, but the attempt has at least been interesting to those who made it. G. C. G.

STRUCTURAL COLOR-DECORATION OF THE INTERIOR OF PUBLIC BUILDINGS.[1] — II.

BEFORE speaking of different forms of painting available, I would like briefly to touch upon the possibilities offered to us by the use of marble, mosaic and plaster, *stucco duro* and sgraffito. These are so closely allied to the first division of the subject, that I would speak of them here. We know that the Egyptians, Greeks, and Romans used color largely in their buildings, but we can have but little idea of the magnificent effects often attained by means of their fresco-painting, encaustic-painting, *tempera*, modelled plaster, mosaic, marble linings and veneering, bronze, ivory, gold and silver overlaying, and inlaying.

For instance, we read of the Golden House of Nero, that the walls were encrusted with gems and mother-of-pearl; of banqueting-halls having ivory ceilings; of a ceiling in the State dining-room, which was spherical in shape, and cut in ivory to represent the constellated skies, and kept in constant motion by machinery in imitation of the stars and planets. This magnificence, inventive and symbolic, partook something of the marvellous and the rare, qualities which we have far to seek in this prosaic age. In their large halls, basilicas, and baths, it was also a custom of the Romans to line the walls with marble slabs to a considerable height, and above to use mosaic or plaster reliefs. The vaulted ceilings were generally coffered, and decorated in plaster reliefs, colored and gilt; bronze rosettes were also used in the coffers.

These were general forms of decoration throughout the Roman Empire both in the West and East. We find them used by the Byzantine builders, in Constantinople, Sicily and Italy, and we may be of opinion that few finer schemes of decoration have ever been devised. In some manner adapted to our modern needs they are available to-day, and it is understood that marble and mosaic are to be adopted in the new Roman Catholic Cathedral at Westminster.

In considering the use of mosaic at the present time, we may hope that the modern and vicious habit of preparing mosaic tesseræ face downwards on a sheet of paper laid on a flat table, and then pressing the sheet of paper into position on the wall, has been finally given up. The old and only right method is to fix each tessera into the cement pushed in by hand from the front. Too many works of the last century are deficient in one of the most important elements of decoration, namely, the right technique. Sir William Richmond, in St. Paul's Cathedral, the largest example of mosaicwork of modern times, has shown in the work which he has done there that there is no more trouble and no appreciable loss of time in doing mosaic-work in the only true way, viz, pushing it in, tessera by tessera, from the front. His assistants after very little practice have been able to do the work on these lines with the greatest rapidity, and naturally with intelligence and interest in seeing their work in position as it proceeds.

Time will not permit me to speak of modelled plaster and sgraffito in any detail, except to express the satisfaction we must all feel that these ancient arts of tried quality are understood and worked in a

[1] A paper by Gerald C. Horsley read before the Society of Arts, and published in the *Journal* of the Society. Continued from No. 1374, page 32.

modern spirit to-day. The composition of *stucco duro* has been often described, and we know by the remains of ancient Roman work found in the Villa Farnesina, and of the works of the sixteenth century in the Loggia of the Vatican, and the Villa Madama, and other buildings in Italy and France, what exquisite possibilities this material presents. The work, particularly in the early Renaissance, was usually decorated in color. This was generally laid on while the stucco was wet as in fresco, and the details heightened with *tempera* or encaustic colors, and accessories enriched in gilt *gesso*.

We may congratulate ourselves that artists like Mr. George Frampton, A. R. A., and Mr. Anning Bell have worked in this material in churches and other buildings in our time. The processes of *stucco duro* and sgraffito are fully described in the "*Arts and Crafts Essays*" published in 1893, the former by the late Mr. G. T. Robinson, and the latter by Mr. Heywood Sumner, whose work in All Saints' Church, Ennismore Gardens, affords an example of modern treatment. I need not do more than name these two forms of lasting decoration, peculiarly structural, and available to us to-day.

I may be blamed for not referring with greater fulness to the painted wall-surfaces and roofs, of which there are many, in our modern churches. This work is raising itself above mere commercial expression, and under the direction, and with the coöperation of the architects of these buildings, we have instances by many painters of ability and knowledge.

If there is one thing which may strike us in this modern work as being different and inferior to the best work of the old time, it is a very general want of use of the full brush of color carried through the work with bold and masterly sweep, avoiding thereby, in the necessary repetition of a pattern, the mechanical and accurate repeat so constantly seen in modern work, and never to be found in the old.

What makes so much ecclesiastical decoration of the present day so devoid of interest is just this absence of intelligent handling. We are better without color if it is not used in a manner consonant with its dignity. We may be sure its revenge on us will be ample if we use it in any other way, as much in the lowliest border or diaper as in the picture it may surround.

In our theatres and places of public entertainment, the same progress is, alas, not being made. The desire of the modern theatre-manager to build a theatre, and to open it in six months, is against the production of anything else than a place in which plays may be produced. We are far behind the French in this matter. In Paris the foyers and staircases of the principal theatres are notably decorated by artists; so that the audience has the privilege of knowing that it is not in a mere box of upholstery, but in a temple devoted to the arts. I am inclined to think that were our theatres of the latter kind the interest of the audience in the art of the drama would be quickened and encouraged.

And now as to the principal methods in use by painters at the present time. Probably, the world has never seen a more beautiful method of painting than buon or true fresco, but, alas, its use has not been fully justified in this country. The Royal Commission I have just referred to took a good deal of evidence as to its suitability for the decoration of the Houses of Parliament. A number of painters of eminence spoke against its being attempted. They advocated the use of oil-color. But the Commissioners, perhaps dazzled by what were then considered the triumphs of modern art, — the frescos at Munich, decided that the new paintings should be in that method.

Dyce, Cope, my father, and one or two others were successively commissioned. Exposed, however, to the bad air of their surroundings these works have, in some cases, suffered beyond repair. So doubtful were the painters themselves as to the suitability of the scheme, that when Maclise was commissioned to paint the walls of the Painted Chamber he, with the sanction of the Commissioners, proceeded to Germany in order to make researches into the practice of stereochrome, or water-glass painting. The result was that he adopted the process in the large wall-painting, "The Meeting of Wellington and Blucher after the Battle of Waterloo"; it was also adopted by Mr. Herbert, who was then engaged on other wall-surfaces in the palace.

You will permit me to remind you of what happens in buon fresco. The powder-colors mixed with lime-water are applied to the last and freshly-spread coat of plaster before it has had time to absorb more than a trace of carbonic-acid from the air. The painting-ground is, in fact, saturated with an aqueous solution of hydrate-of-lime, that is, slaked lime, while there remains a large reserve of this compound in an undissolved condition. When on such a surface a layer of pigment mixed with water is placed, as that water evaporates the lime-water in the ground diffuses into the paint, soaks it through and through, and gradually takes up carbonic-acid from the air, thus producing carbonate-of-lime, which is the actual binding material.[1] The whole painting gains in this chemical action, appearing to absorb light and to reflect it from the sand facets of the ground to the spectator.

But, unfortunately, and here I again quote from Professor Church's interesting book "*The Chemistry of Paints and Painting*," "the protection afforded to the pigments by the binding material, this carbonate-of-lime, is not generally very efficient. In the case of a dry wall, free from soluble saline matter, and exposed to a pure atmosphere, it may remain good for centuries. But in air contaminated with the products of the combustion of coal and gas, and with tarry and sooty impurities, a fresco picture soon perishes. The binding carbonate-of-lime is converted into the sulphate, breaking up the paint. The same causes will form sulphate-of-magnesia from the carbonate-of-magnesia in the plaster, and the paint will scale off."

In our large towns, therefore, to-day, buon fresco has no chance of lasting.

The stereochrome, or water-glass, process consists in spraying the painting after completion with a warm dilute solution of potash-silicate, or potash-soda silicate, which is obtained by fusing the purest sand obtainable with carbonate-of-potash or carbonate-of-soda. The pigments themselves are mixed with some of the fixing liquid. This form of painting is a German invention of comparatively recent date; it has not been frequently used in this country, and we have very little experience of its behavior.

In the consideration of the possibilities of *tempera* painting we find ourselves on surer ground, no longer so fearful of the consequences of the contaminated atmosphere of our towns. I am glad to be able to read you a few words I have received from Sir William Richmond as to this medium, which he used on the walls of a modern church at Cheltenham a few years ago. He says: —

"The wall was prepared with lime and sand, the final *intonaco* was in marble-dust and well-slaked lime, and it was wonderfully white. The whole design was drawn in charcoal, corrected with care. Egg, Capri wine and powder-colors were used. The yolk of egg alone was used, plenty of wine and distilled water. The first painting should be in what the Italians called 'Verdaccio,' namely, raw siena (black and white), with plenty of *impasto*. In two hours this can be glazed with warm color and painted into. I am quite certain that the yolk of egg and wine form the very best and most durable medium for wall-painting. Most of the Italian wall-paintings which have lasted were not painted in fresco, but in the *tempera* of yolk of egg, the essential oil of which is a most powerful binding liquid, enabling the painting to dry like a rock."

Sir William further says: —

"I prefer yolk of egg and wine, even to buon fresco; the color is almost as pure, not quite so light, and if it is necessary to get rich color, the medium will give it to any extent."

Professor Church, speaking of the large amount of oil in the egg-yolk says, "This vehicle does not act so effectually as oil and varnish in locking up pigments, and so the protection against change which it affords is less." But I think we may take it that the protection is certainly considerable, while the old method of varnishing the painting with sandarac in oil affords further protection against moisture and impure air.

The well-known spirit fresco, invented by the late Mr. Gambier Parry, differs little from ordinary oil-painting on account of the large quantity of oil in the copal, which forms so much of the medium, the constituent parts of which, I may remind you, are only multiples of these proportions, viz.: —

	ozs.
Gum elemi or elemi resin	2
Pure white wax (beeswax)	4
Oil of spike lavender	8
Finest preparation of artists' copal	20

With this medium incorporated by heat all colors in dry powder are mixed. It appears that Mr. Gambier Parry gave the name of spirit-fresco to the method because oil of spike and turpentine may be freely used as liquids during the process of painting. The beeswax secures, of course, a perfectly matt, or dead surface, but it is liable to produce a kind of bloom in the course of years, and may wholly disappear in the course of time.

Besides the paintings by Mr. Gambier Parry at Higham and Gloucester Cathedral, Lord Leighton's "Arts of War" and "Arts of Peace," at South Kensington, and seven paintings by Ford Madox Brown, in the Town-hall of Manchester, are examples of this method. They appear to be standing well, though we may expect them to darken, and there are a few signs of the bloom referred to above in the "Arts of Peace."

Professor Church considers that a sound medium is to be found in the proportions of: —

	ozs.
Oil of spike	12
Paraffin wax	4
(The two mixed by heat.)	
Copal picture varnish	20

He advises the pigments being mixed in blown linseed-oil, rather than in the medium itself, as Parry recommends.

I need not do more than allude to Parry's Ely medium. Briefly it is: One part pale drying oil; one part strong copal varnish; two parts japanner's gold-size; two parts turpentine, and the powder-colors to be ground up in the medium. It is just oil-painting over again with the gold-size to give the necessary deadness of surface. He painted the eastern part of the nave, wooden roof, also the octagon and transept ceiling at Ely Cathedral in this medium.

I have dwelt on the component parts of these wax and oil mediums in some detail, as it is but a step from them to the method which is generally adopted by painters to-day. I refer to the prevalent custom of painting in oil on canvas, and then, on completion of the picture, having it fixed, or *marouflé*, as the French call it, to the wall or ceiling; that is to say, the canvas is fixed by means of a thick paste of white-lead, oil and copal varnish spread upon the wall and simultaneously upon the back of the canvas.

[1] I am indebted to Professor Church's "*The Chemistry of Paints and Painting*" for this description.

The French painters in the beginning of the nineteenth century, like their German brethren in Munich, painted mural works in fresco, but they were already beginning to discard the practice when we in our wisdom were working in it at Westminster. They also used encaustic-painting (Delaroche's "Hemicycle" in the École des Beaux-Arts is an example), but since 1870 the most important works have been painted on canvas fixed in the way I have described; such are the great wall-paintings by Puvis de Chavannes, in the Panthéon, in the museums of Amiens, Rouen and Lyons; the Sorbonne, and the Library in Boston.

This, too, is the method adopted in the Royal Exchange, at Liverpool, at Glasgow, and by Messrs. J. S. Sargent, R. A., and E. A. Abbey, R. A., in the Library at Boston.

Without going deeply into technicalities which would naturally vary with each painter, the colors used are simply oil-colors, with a medium of wax and turpentine. Professor Moira, who has painted in this way at the New Renshaw-Street Chapel in Liverpool, and at other places, tells me he likes the canvas to be fairly coarse and open, so that there should be no hindrance to the fixing material incorporating itself with the colors laid on. This is better achieved by doing the first painting only in the studio, and completing it *in situ* after it has been fixed upon the wall or ceiling. The painting of the picture *in situ* in this way will, I am sure, commend itself to all as a most important side of this system of decoration. It is understood that some of the modern works I have named have been painted entirely in the studio; corrected in many cases, no doubt, when in position. But as a practice it must surely carry with it its own condemnation. Although scale-drawings and models may be made with the utmost care, and cartoons in full size tried in position, all of which should be done, and invariably are done, before the painting is begun, unless the work, or at least the major part, is carried out in the building, it is not possible for the painter to be confident as to the correctness of his scale, or, what is more important in its difficulty, of his color. Both these elements, more particularly the last, must surely be influenced by the size and lighting of the building, an intimate knowledge of which is revealed by working in it. Are we to suppose that the ceiling of the Sistine Chapel would have been as magnificent as it is if it had been painted by Michael Angelo in a studio and then fixed in position? I confess the very thought is sacreligious, and I tremble at suggesting it.

In this connection, I am reminded of a painting on canvas, in St. Alban's, Holborn, which was painted chiefly on the wall, where, by its position in a dark corner of a church, certain colors had to be used which are startling in what would be their inappropriateness in a better light. For instance, in order that the hair of the Saviour, one of the figures in the composition, should appear brown, pure vermilion had to be largely used; ordinary light brown appeared black.

But it is unnecessary to multiply instances, and I would venture, therefore, only to suggest that, as, in most cases, the position of the painting directs the color to be used, it is desirable that it should be, as far as possible, painted *in situ*.

It is to be hoped that the convenience of this modern method of painting on canvas will not deter painters from working directly on the plastered wall in *tempera*, oil, or encaustic. If the beautiful qualities of fresco are denied to this country, there are yet the qualities inseparable from a plaster ground, which a canvas surface can never present in the same way.

Design I need not touch upon. There is no excuse for bad work, surrounded, as we all are, by the highest examples. A fine translation of modern life appears to be growing in mural painting of the great type, and is heartily to be welcomed. In this connection, I would draw attention to Mr. Furse's work at Liverpool, and some of the work at Glasgow, while, in allegory, we have the great work of Mr. Sargent at Boston. In setting ourselves a standard we may remember, perhaps, the words of Puvis de Chavannes: "*Toute décoration ne peut être belle que dans la mesure où elle reflète la Nature et en traduit la passion.*"

[To be continued.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

SOME REMODELLED COLONIAL CHURCHES: — CONGREGATIONAL CHURCHES AT WARE AND WILLIAMSBURG, MASS., AND MARIETTA, O.: THREE PLATES. ALTERATIONS BY MESSRS. E. C. & G. C. GARDNER, ARCHITECTS, SPRINGFIELD, MASS.

See article elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

CLUB-HOUSE FOR THE SMITH AND WESSON SHOOTING-RANGE, SPRINGFIELD, MASS. MR. G. WOOD TAYLOR, ARCHITECT, SPRINGFIELD, MASS.

NOTES & CLIPPINGS

TREES IN PARIS. — The annual cost of maintaining trees in the streets of Paris, where they alternate in rows with iron lamp-posts, is $90,000. There are 87,693 trees in the city of Paris growing in rows along the sidewalks, exclusive of the trees contained in the city parks, gardens and squares. A corps of tree-inspectors is constantly on the alert watching the trees. The soil is frequently renewed. Iron "corsets" are placed around young trees to protect them from injury. A circle at least three yards in diameter is kept free from asphalt or pavement around the base of each tree. This circle is usually covered with an iron grating, to preserve the proper level of the sidewalk. The trees are watered by the street hose twice a day. Excavations are made around the trees so that the water collects about the base of the trunk and percolates freely to the roots. The variety of trees planted along the Paris sidewalks comprises horse-chestnuts, elms, acacias, lindens, sycamores and the Japanese sumac. Horse-chestnut trees are great favorites with Parisians, because they come so early in leaf. The present spring is unusually advanced. The horse-chestnuts put out their leaves on March 17, and, notwithstanding the recent cold winds and rain, the streets of Paris are already fringed with delicate green branches. Ever since the Haussmannization of Paris began, fifty years ago, the French Academy of Science and the Health Department of the city have never ceased to impress on the Municipal Council the necessity of maintaining rows of trees along the main streets. The City Fathers fully appreciate that trees materially improve the health-rate of the population, by absorbing noxious gases and emanations, and by renewing the air breathed by the citizens. Paris has within the mural fortifications a population of 2,660,559 inhabitants. If the public parks, squares and gardens be included in the calculation, it will be found that in Paris there is at least one tree for every inhabitant. The official statistics, however, do not comprise trees planted in public or private parks, squares and gardens, but only those growing in rows along the sidewalks. The number of these trees is 87,693. That is to say, in the streets of Paris there is one tree for each 3.3 inhabitants. It might be interesting to ascertain how the six most populous cities in the United States compare with Paris in this respect. New York, with its population of 3,437,202 inhabitants, in order to reach the Paris standard of a tree for each 3.3 of its citizens, should have 104,158 trees planted in its streets, exclusive of those in public or private parks, gardens, squares or back-yards. Chicago, with its population of 1,698,575, in order to keep up with Paris, should possess rows of trees along its sidewalks containing 51,139 trees. Philadelphia, with a population of 1,293,697, should have 39,203 trees in its streets. St. Louis, with a population of 575,238, ought to have its streets lined with 17,431 trees. In order to compete with Paris in tree-culture, the 560,892 residents of Boston should have 16,997 trees in the streets, exclusive of those in the Public Garden, Common and parks and squares. Baltimore, with a population of 508,957 inhabitants, should have 15,423 trees in her streets. It is probable that some of these cities may already have attained or even exceeded the Parisian standard of one tree to each 3.3 inhabitants, but all interested in the question of municipal science will be gratified to learn that the tree-department of the city of Paris is felt to be of paramount importance for the public health, and the Municipal Councillors of Paris do not regard green foliage as a luxury, but as an absolute necessity. — *C. I. B. in the N. Y. Tribune.*

HOMESTEAD ENTRY CANCELLED. — The Federal land officials in Santa Fé, N. M., on March 27, cancelled the homestead entry of Richard Wetherell, of New York, upon orders of the General Land Office. Wetherell is manager of the Hyde Exploration Company, engaged in numerous enterprises in northern New Mexico, and had filed upon the Pueblo Bonito, Catro Kettle, and Pueblo de Arroya, three of seventeen prehistoric ruins in Chaca Cañon, Southern San Juan County. When he found his homestead entry did not quite cover the ruins he made an amended entry. The Hyde Exploration Company thereupon erected stone buildings on the land, costing $10,000, established a stage-line and hotel for tourists, and commenced excavating. According to a sworn statement made by Wetherell to J. S. Holsinger, special agent of the United States Land Office, he took out of the ruins 50,000 pieces of turquoise, 10,000 pieces of pottery, and many wooden and stone implements and skeletons, which were sent to the American Museum of Natural History at New York. About 500 rooms in the ruins have been excavated thus far, and 179 pit excavations have been made. The General Land Office cancelled the homestead entry because the land was not filed upon with the intent for which homestead entries could be made. — *N. Y. Times.*

LONG-DISTANCE HEATING IN GERMANY. — United States Consul-General Richard Guenther, of Frankfort, reports to the State Department the completion at Dresden, Germany, of the largest long-distance heating-plant in Europe. From a central station, says the Consul-General, many public buildings on the left bank of the River Elbe, including the theatre, the museum, the castle, the royal kitchen, the custom-house, etc., are heated. The greatest distance over which heat is transmitted is three-quarters of a mile. The total heat-consumption per hour is 15,200,000 heat units. The usual steam-pressure is two atmospheres. Ten of the fourteen boilers are used, and to guard against accidents two main lines of pipes have been provided. The loss of heat in transmission is from 4 to 4½ per cent. The pipes are protected by two layers of tin, the inner layer being perforated and the outer one covered with silk. The largest pipes have a diameter of 216 mm. (8.51 inches). — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, MAY 10, 1902 No. 1376

CONTENTS.

SUMMARY: —
Attempt to modify the Boston Building-laws in the Matter of Subdivision of Space. — The London District Surveyorship System would afford Relief to the New York Department of Buildings. — Rapid Erection of Steel-frame Buildings. — Will Insurance Companies assure against Rust? — The Cause of a Boiler Explosion in Detroit. — Proposal to use the Columns of the "Colonnade Hotel" in New York. — The Royal Gold Medal and the late Mr. Bentley. — The Partial Demolition of the Walls of Avignon. 40
JOURNAL SKETCHES IN CHINA. — II. 43
ROME AND ROMANESQUE FRANCE. — I. 46
EDWARD R. SWAIN. 47
SOCIETIES. 47
ILLUSTRATIONS: —
Store of R. H. Macy & Co., Herald Sq., New York, N. Y. — Hôtel de Ville, Lyons, France. — Notre Dame de Fourvière and the Church of St. Jean, Lyons, France. — Views in Lyons, France: The Place Bellecour; The Palais de Justice and the Slope of Fourvière; Interior of Notre Dame de Fourvière; The Church of St. Paul and the Church of St. Martin d'Ainay.
Funerary Monument, Bougé-Chambalud, Isère, France; — Commemorative Monument, Chartres, France. 47
COMMUNICATION: —
A Correction. 47
NOTES AND CLIPPINGS. 48

THE Boston *Herald* gives a very timely warning against an attempt which is being made to nullify the provision in the building-law which limits the area which can be covered by a non-fireproof building, without subdivision by brick walls, to eight thousand square feet. This is, perhaps, the most important and valuable provision in the whole law, and it is also the one which the owners of department-stores and other dangerous fire-traps have always fought hardest and most persistently against. Last year, certain iron-workers came to the Legislature, representing that the proper handling of their materials and machinery required larger undivided areas than eight thousand square feet, while the character of their business did not demand the steel-and-concrete construction with which alone, under the present law, larger areas may be enclosed. Any one who has seen the travelling-crane system of modern iron-working shops can understand the importance of sufficient space for their operation, as well as the smallness of the danger attending a reasonable extension of the limit in such cases, and the best experts were disposed to favor the relaxation of the rule, in the portions of the city outside the so-called "fire-limits." This year, however, new interests have taken up the matter, and the request of the iron-workers has appeared again in the form of a bill, which is now pending before the Legislature, and provides that not iron-working shops merely, but all buildings used for "working in or storing non-combustible materials," outside the fire-limits, shall be exempt from the provision limiting undivided area. It is hardly necessary to point out, as the *Herald* does, that "non-combustible" is a very elastic adjective, applicable to many substances which would be objectionable in case of a great conflagration; while even a building devoted to "working or storing" non-combustible substances may contain wooden work-benches, shelving and other combustible incidentals to a very dangerous extent; and there is always a possibility that a building originally intended for the storage or working of incombustible materials may, through change of ownership, or other causes, be utilized for working or storing inflammable materials. No law yet devised has been able to prevent changes of this kind, which constitute one of the principal sources of danger in ordinary constructions; and any modification of the building-statutes should have such a contingency in view.

THE New York Department of Buildings complains of the amount of unnecessary work imposed upon it in the examination, rejection and reëxamination of plans by incompetent or careless architects, who, in fact, are, in New York, rather disposed to depend upon the engineers of the Department to make the corrections in their drawings which they ought to be capable of making themselves. The problem is really a serious one, not only for the officials of the Department, but for the skilful and competent architects, whose carefully prepared plans are kept waiting, often for weeks, while the Department engineers are correcting the blunders of ignorant pretenders. Under the Tammany régime, a scheme was prepared for registering on the books of the Department such architects, builders and superintendents as should give proof of competence, by examination or otherwise, and issuing permits to build only to registered persons; but there were doubts of the legality of such a regulation, and it was never adopted. Various projects for licensing architects, or otherwise separating men of proper training from the ignorant and unskilful, have been brought before the New York Legislature, and some one of them may, in course of time, become a law; but, in the meanwhile, it seems as if needed relief might be afforded by an adaptation of the London plan, appointing several skilful and experienced architects in each borough to act as examiners of plans. Projects for building would then be brought before the examiner for the district in which the new structure was to be erected, just as all plans for building in London must be submitted to the District Surveyors; and the drawings would be received at the Department of Buildings only after they had been made satisfactory to the district examiner, and had been stamped by him. With only such plans to consider as had been approved by the skilled architects who served as district examiners, the duties of the Department engineers would be very much lightened, and the business of the Department could proceed with far more regularity and despatch than is now the case, to the great advantage of all concerned. The London District Surveyors receive from each person submitting plans for examination a small stated fee, and the same arrangement might be made for the remuneration of the district examiners in New York. In that way the city treasury would not be burdened with additions to its salary-list, and persons proposing to build would gladly pay a dollar or two for the sake of prompt examination of their plans, while this system would adjust the remuneration accurately to the work done. It is not to be expected, of course, that the district examiners would guarantee the perfection of the plans which they had approved, any more than the Department engineers guarantee, under the present system, those which they pass. In both cases the object is simply to secure the judgment of competent experts, and correction in conformity with such judgment, on all plans, before they are received at the Department, leaving to the Department the duty more properly belonging to it, of interpreting the law in cases of difficulty, watching over the execution of plans for which permits have been granted, and punishing variations from the drawings and specifications on file, and other violations of the law.

THE advantage of the modern steel-frame construction over the older style in point of rapidity has been strikingly shown of late. It is obvious that, while every portion of a steel-frame structure takes as long to make as the corresponding part of a building of masonry, it is possible, in the former, to prepare the parts outside, and, when they are ready, to "assemble" them, to use the apt expression of one of the most distinguished of the great contractors, with a rapidity which is out of the question in masonry structures. In costly office-buildings, the saving of interest and rent by shortening the period of construction is of great importance; and this, together with the increase of rentable floor-space afforded by the thin walls of the steel framing make this very popular with the owners of such property. For example, a fifteen-story building has just been completed in New York, in a little over five months from the time that the first basement column was set in place; and a contract is said to have been signed for the construction, within a similar period, of a banking building twenty-one stories high. In New York, office-buildings to the value of twenty-four million dollars, all of steel framing, are said to be in process of construction, and the demand for new offices exceeds the supply.

MEANWHILE, the anxiety of architects in regard to the durability of steel skeletons encased in concrete or masonry does not diminish. A steel-frame building, twelve years old, which was recently torn down in Chicago, is said to have had its lower columns eaten half through by rust, although the concrete casing around them was so thoroughly filled in, and so firmly attached to the steel, that it could only be removed in chips, each chip bringing with it a portion of the

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

oxidized metal. We cannot vouch for the truth of this story, which contradicts almost everything that is known about the action of concrete on iron, but, if it is true, further investigation is needed at once. The collapse of a steel-frame building would cause something like a panic among the owners of the most costly mercantile and office buildings in the country; and, if the columns of such a structure have really been eaten half through in twelve years, some of the largest in Chicago, which are very close to their twentieth birthday, must be in a precarious condition. It might not be unprofitable for the insurance companies to take up the matter, and issue policies against loss by rust in steel-frame structures. Prudent owners, who are too sensible to risk their property in what is, in this respect, an experiment, would be very glad to pay a reasonable sum for a contract of indemnity; and the insurance companies would be able to study the subject more impartially and effectively than any one else. We do not know whether the American companies would be at liberty, under their charters, to engage in such contracts; but the English companies could do so; and, considering the immense sums of money at risk, and the comparative ease with which danger, if it is found to exist, can be averted, if taken in time, this branch of the business ought to be very profitable. It must be remembered that an insurance company has always at hand an efficient weapon for enforcing its orders, in the shape of a notice that a policy will be cancelled if they are not immediately complied with; and a few good inspectors, experienced in the effect of various circumstances on the mixed construction, and skilled in detecting symptoms of disorder, as well as in prescribing the proper remedy, might, within the next ten years, do incalculable service to real-estate interests, as well as to the insurance companies employing them.

THE explosion of the boiler in the factory of the Pemberthy Injector Company, in Detroit, which destroyed the building in which the boiler stood, and caused the death of thirty people, and injury to as many more, has been studied by experts, with very interesting results. From the report of Professor R. C. Carpenter, of Cornell University, which is published in *Power*, as well as from the verdict of the coroner's jury, it appears that the explosion was due to the bad quality of the steel in the boiler and the bad workmanship upon it. Not only were the sheets of thickness less than the three-eighths of an inch called for by the specification, but they were uneven in quality, portions being highly charged with phosphorus, and being, in consequence, so brittle that pieces could easily be broken from them with a hammer. The riveting was badly done, the rivet-holes in the two sheets in some cases failing to come opposite each other, and the space being filled with a small rivet, crushed down on each side by a power riveter, so as to present the appearance of a rivet of proper size. The fracture, however, was not through the rivet-holes, but irregularly parallel with them, and Professor Carpenter concluded that it was due, not to direct strain, which, under the careful management of the engineer in charge, did not exceed the safe limit, even for the thin sheets actually used, but to the brittleness of the sheets, which had caused them to crack along the line where their expansion and contraction would tend to bend them slightly, first in one direction, and then in the opposite direction. Flange steel of first quality, such as the specifications for the boiler required, would, it is needless to say, bear without harm an indefinite amount of bending of this kind, and the use of a brittle and phosphorized steel in such a place was, as most people will think, little short of criminal. The coroner's jury seem to have held this view, for, while they exonerated the Pemberthy Company, and its officers and engineer, from all blame in connection with the catastrophe, they held the makers of the boiler responsible for it.

THE old Colonnade Hotel, in Lafayette Place, New York, one of the most charming pieces of street architecture in any city, is to be torn down, and the Municipal Art Society proposes, if money enough can be raised for the purpose, to buy the granite Corinthian columns of the colonnade, and present them to the city, for use in some form in one of the parks. It is suggested that they might be utilized to form a screen, to hide the tracks of the Sixth-Avenue elevated railway from Bryant Park, on which the great New York Library is now in process of construction. If it should be impracticable to set them here, there are plenty of other places in the New York parks which they would adorn very effectively.

THE award of the annual Royal Gold Medal by the Royal Institute of British Architects has been disturbed this year by the death of its destined recipient, Mr. Bentley, just before the formal award. The Council of the Institute suggested that the medal might be given to Mr. Bentley's family; but the King, to whom this suggestion was submitted, very politely, but decidedly, objected to it, on the ground that such an award would form a dangerous precedent. The Council of the Institute will be obliged, therefore, to find a new candidate.

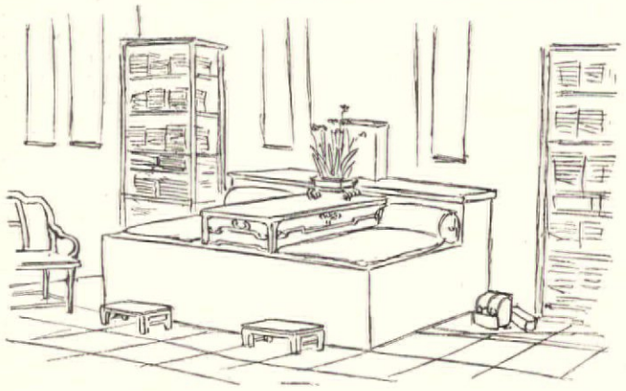
MR. BENTLEY, the architect, who, if he had lived, would have been recommended for the medal, was almost unknown to the profession in this country, but his originality and a certain breadth and force in his designs, have long been greatly admired by architects in England. Being of a reserved, and rather eccentric, disposition, he rarely figured in the great competitions, or as the architect of noted public buildings, and his talents were devoted almost exclusively to the service of the Roman Catholic Church, of which he was a devout and zealous member. He made and executed many remarkable designs for ecclesiastical buildings of various kinds for this Church in and about London, and it is very much to the credit of the Royal Institute that its officers should have chosen for its highest honors an artist so little known to the public, in place of men of much more conspicuous worldly position.

TWENTY-FIVE or thirty years ago, Viollet-le-Duc was sent to restore the ancient walls of the city of Avignon, once the fortified residence of the Popes. According to his own account, there was not very much left of the original walls, but, with what still remained for a pattern, he was able to construct on the old foundations an extensive and imposing specimen of mediæval fortification. Although the long ranges of lofty, crenellated walls produced a great effect upon tourists, they were not, after the novelty had worn off, entirely charming to the inhabitants of the city, who found the space within the fortifications becoming crowded, and did not like the idea, if they built themselves houses outside the walls, of having to make a long circuit, in search of a gate, whenever they had occasion to enter or leave the older part of the city. They represented to the Government the importance of having the walls removed, in order to allow the city streets to be extended; and, to meet the sentimental objection, that this would involve the destruction of an ancient monument, they pointed out that the greater part of the walls, having been the work of Viollet-le-Duc, could only be considered an ancient monument by a violent effort of the imagination. The application of the citizens was received, and submitted to long discussions. Some people sympathized with them; while others held that Viollet-le-Duc's work, being the completion of an ancient monument fallen to decay, was really a part of the monument, and shared its sacredness. Between the two parties nothing was done; and, as the population of Avignon increased meanwhile, and the need of more space for houses became greater, the Mayor of the town, M. de Boisserin, determined to take the matter into his own hands. He did not dare to interfere openly with the walls, which are State monuments, and, as such, under the jurisdiction of the Prefect, who represents the State, in distinction from the municipal authority; but, one evening, he invited the Prefect to dine with him, and, to make sure of his guest, went to his house for him. In the meanwhile, he had prepared an order, directing the immediate demolition of the Porte Limbert, one of the most objectionable portions of the fortifications, and had made sure that a sufficient force of workmen should be ready to carry it out. While the Mayor and the Prefect were at dinner, the order was issued, and a copy, as the law requires, was sent to the prefecture for the approbation of the representative of the State. As this official was, at the moment, comfortably dining with the Mayor, and no one thought it necessary to forward his letters to him, he was unable to make the protest which he certainly would have made if he had known what was going on. In the meantime, however, forty men were busily at work on the Porte Limbert. Late in the evening, the Mayor invited his guest to take a walk, and led him to the place where the Porte Limbert had been. The Prefect lifted up his hands in horror at seeing a monument of the State in ruins; but it was too late to object, and the Mayor, coolly avowing his part in the transaction, and the reason for it, conducted his afflicted friend home. What punishment was inflicted on the Mayor for his audacious conduct we are not informed, but it seems probable that the prayers of the citizens of Avignon in regard to their walls will receive more attention than they have had hitherto.

JOURNAL SKETCHES IN CHINA.[1]—II.

Foot-warmer.

WITH this digression let us return to our Chinese family. This my first critical visit to a Chinese home was made on a cold and rainy day in February; there was no fire in the house and no visible means of providing warmth, the apartments were dark, damp and chilly, the floor was wet and cold, and I began to stamp my feet to get warm, upon which a servant brought me a bronze foot-warmer. Despite this I was compelled to wear my thick winter ulster during my stay. It was, indeed, a unique opportunity to be in a gentleman's house the entire day and see the full round of domestic economies, cooking, washing etc., going on without disturbance save what my presence excited. The library-room was very formal and stiff in appearance; the place for reading or study consisted of a raised floor which projected like a square block from the



Library: Private House, Shanghai.

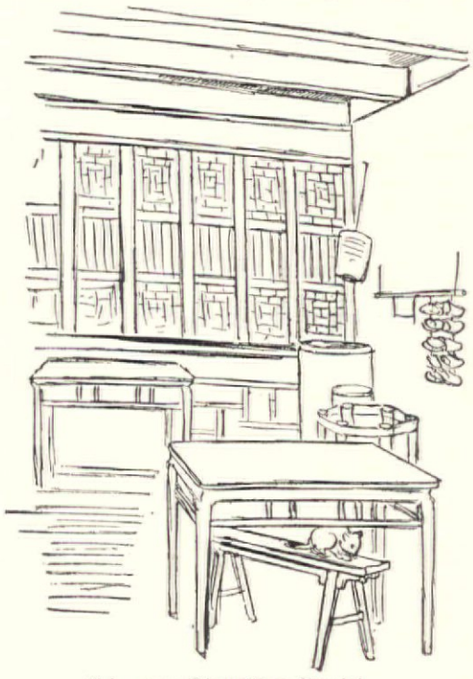
middle of one side of the room to a distance of from 7 to 8 feet. A higher portion next to the wall formed a shelf a foot or more in width; resting on the projecting portion was a long, low, narrow table running out at right angles from the wall, leaving a space 3 feet wide on either side; this space permitted a reader to recline at full length or to sit on the edge of the platform resting his feet on a low stool at the end. Book-shelves were against the wall on either side of the platform and on the wall were hung long, narrow kakemono, on which were inscribed precepts from Confucius or some other revered sage. The accompanying sketch will best illustrate the arrangement above described: At the side of the main entrance of this room was a writing-table upon which was a tray containing a brush-holder, inkstone, a Chinese water-pipe and other conveniences, and here one of the young men sat while I made a hasty sketch of him. On each side of the room, against the wall, was a square table, with a chair on either side in touch with the table and the wall. It looked very stiff and formal. During my inspection of these details a little sister of my host came into the room; she was exceedingly shy and held close to her brother. I tried to induce her to come to me, but though she smiled at my attempts in a frightened way I could get no farther in my advances; whereupon I proceeded to make a sketch of her, she, meanwhile, looking very dubious and clinging to her brother all the time. The band over the front of her head was a thick affair of black silk richly embroidered in pearls mounted in gilt; the stuff from this, hanging over her forehead and looking like a bang, was composed of black silk thread. The hair behind was wound up in two compact pugs which were secured in some way on each side of the head; her ears were rather large and the outer margin had two perforations, and at the time held two simple gilt rings. She was very pretty, ten years old and the daughter of a Chinese gentleman, and yet when I asked her brother to induce her to give me an autograph on my sketch he told me, in the frankest way, that she could not write and that girls were not taught to read or write. Here was another startling contrast to the Japanese which English writers, of course, recognize as an evidence of the superiority of the Chinese. I particularly noticed the little compressed feet of the girl, and while sketching her an aunt passed through the room with the gait that reminded me of a goat or one walking on very short stilts. They do not limp, but simply stump along.

Writing-table, etc.

Every one that I saw in the house was clothed in thickly quilted garments and my entertainer wore a fur robe besides. It was true I was chilled to the bone in my thick winter ulster, and from my short experience it seemed to me that the Chinese city-house, though having thick brick walls and closed doors, was as cold as the Japanese house, with a chill which the latter does not possess and dirt which only an Ainu hut could parallel.

My host and his friends were dressed in the ordinary costume of the better class of Chinese, and, curious to know the cost of their clothing in order to compare with that of our own, I made bold to ask my host the price of everything he had on at that moment. He showed no surprise at my curiosity and gave me *seriatim* a list of the prices which had been paid for the clothing, which he assured me, represented the daily garments of a young man of his class. Long overcoat lined with squirrel-skin, $35; short satin gown, $60; waistcoat, $4.00; leggings, $3.00; sleeves, $1.00; stockings, 20 cents; hat, 50 cents; wadded gown, $5.00, and a few other items brought the sum to $110.70. He further informed me that a finely dressed Chinaman might easily have on clothing costing $1,500.

From the study we entered a large dining-room, possibly 20 feet



Dining-room: Private House, Shanghai.

square. It was dimly lighted like all the other rooms, gloomy better describes it, and cold and damp besides. In this room were various tables, chairs, a case of large drawers, a cupboard and a number of well-constructed benches, in form not unlike a "carpenter's horse," only made of a dark, hard wood and finely finished. Among other objects was a baby's chair made of a stout bamboo in the form of an octagonal tube with a partition half way down upon which the baby rested. It was as brown as an old meerschaum pipe from age and grime. Dirt and disorder were in evidence here as elsewhere in the house. The windows had a complicated framework, too intricate to hastily sketch. The formula for the window-frames struck me as the same over a wide region in China. I saw the same at Canton and have seen photographs of buildings in other places in which the same design appears. The dining-room opened directly into a yard behind the main house, and across this yard, at a distance of 15 feet, was the kitchen, a narrow tiled roof extending across the yard from the dining-room door to the kitchen door. Under this roof an old woman sat astride a bench washing clothes in a large shallow tub, which also rested on the bench. The windows of the kitchen had close, net-like wooden frames covered with paper, as in the Japanese *shoji*, but all the little squares were broken through and there was no evidence that any attempt had been made to repair them, and this neglect in a fine house, too. Again, the contrast with similar conditions in Japan, where if by accident a hole is made in the *shoji* a bit of paper is cut out in the shape of a cherry or plum blossom and the hole is patched with this tasteful device. Even in the poorer houses in Japan this dainty way of mending rents is often seen. Nowhere in the house

[1] Continued from No. 1372, page 13.

did I see the evidence of any attempt having been made to repair or to prevent matters from going to rack and ruin.

While the window-frames in the kitchen and out-buildings consisted of a close framework covered with paper, in the house proper, many of the windows were made of vertical slats of bamboo, 3 inches apart, to which were tied the thin, translucent shells of a species known as

Back-yard of House, Shanghai.

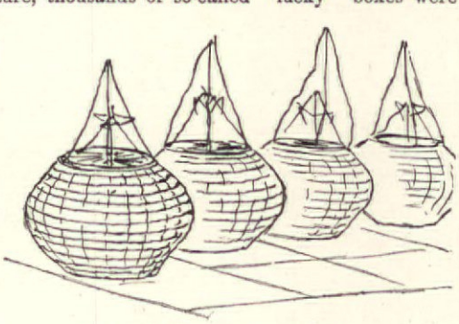
Placuna. These shells are flat, circular, and are trimmed into a rude square and perforated at the edges, so that they may be tied to the bamboo frames. The shell admits only a dim light and represents the window-glass of China. The use of this material by the Chinese is a good illustration of their conservatism. Window-glass can be cheaply purchased in the foreign concession, yet the usual contempt that the Chinese holds for anything foreign confines him rigidly to this archaic device. The kitchen was dark, gloomy and dirty. It was anything but appetizing to see so much dirt and to remember that here was to be prepared the dinner I was invited to eat. The stove was a curious affair. It was made of brick and plaster and occupied considerable space in the room. Three large iron pots in line were permanently built into the structure and two smaller pots were built near the chimney. Many of the Shanghai kitchens had chimneys — a feature rarely seen in the Japanese kitchen. The opening of the stove was behind, and here the wood was piled for the fire. In the chimney above the stove was a shelf-like recess on which was a candlestick, and on the side of this recess was suspended the kitchen deity, as well as conveniences for burning incense. The floor of the kitchen was paved with small bricks and these were grimy with wet dirt. There was no scraper nor mat at

Kitchen Range, Shanghai.

the door and the inmates did not remove their shoes for indoor slippers. So far as I could see, the mud and filth of the street were tracked into every part of the house. The rooms were all high-studded, much higher than our rooms at home, but the walls and ceilings were discolored with dirt and grime. Back of the kitchen was a long, narrow closet-like room, in which were a number of lanterns hanging from a rope, a few shallow tubs leaning against the wall, and at the farther end a niche in the wall holding some small jars. Even in this shed-like place facing the dirtiest of yards the window-frames were of intricate patterns. In the sketch of the kitchen what appears to be a table is in reality a chopping-block supported on four legs. In Oriental kitchens a large chopping-block or plank is always seen, and the sound of the rhythmical blows as the cook, with a knife-like chopper in each hand, beats a tattoo is a characteristic of Chinese as well as of Japanese houses. In this kitchen, as in other kitchens I saw, clutter and dirt had the upper hand. Baskets, pots and dishes littered the table as well as the little table beneath. There were no chairs in the room, but long narrow benches such as have been already described. The floor was also littered, and confusion and damp dirt pervaded the place. Indeed, if I pause for a sentence, the appalling character of the dirt, not ordinary clean dirt, but what appeared to be pathologic dirt, intrudes itself and I have not done the matter justice. I must admit, for fear of doing the Chinese an injustice, that the contrast was the more pronounced having just come from Japan, where the shoes are always removed before entering the house, the floors and mats are repeatedly swept, and the woodwork of the rooms and the floor of the veranda are often wiped with a damp cloth.

In one room we passed there had just been brought in four large straw baskets fresh from the maker. These were as big as large pumpkins, and had a light framework of wicker above, evidently made after some definite formula. The baskets seemed too frail to bear the usual treatment accorded these archaic yet beautiful devices. On inquiry, I was told that on the anniversary of the death of some ancestor one of these baskets, filled with gilt paper representing money and bought by the peck at a neighboring shop, is burned at the grave.

One notices at the doorway of shops, at the gateway of a city and at other places little piles of ashes on the ground, an evidence that joss-paper, as the foreigner calls it, has been burned as a propitiatory offering, or to ward off evil influences. One feels an extreme contempt for a people guilty of such superstitious and ridiculous practices until he recalls the various superstitions and credulities which characterize his own race. Only a few years ago, in Boston, that centre of intellectual culture, thousands of so-called "lucky" boxes were sold. These were said to have come from India and to be endowed with some peculiar property whereby the possessor would secure good luck, and many testimonial letters were published showing their marvellous potency. The city authorities finally stopped the sale of them as fraudulent, and then it was discovered that they had all been manufactured in Lynn, a neighboring town, and the only property with which they were endowed was the sweat of two overworked wood-turners. Thus much for credulity. Indeed, if we but stop to enumerate the number of superstitions believed in by our own people the list would almost parallel that of the Chinese, who are supersaturated with them. As a proof of this we have only to recall the appearance of an otherwise rational American backing out of his front door in order to see the moon over his right shoulder, or the sight of a man stepping into the mud rather than walk under a ladder, or a hungry man missing a good dinner to avoid making thirteen at the table. An equal absurdity is to see an apparently sensible man draw from his pocket a handful of change with which is a well-worn rabbit's foot. These and many other superstitions will readily suggest themselves to every one. As a matter-of-fact, we grow up with our superstitions and our methods of lying and are no longer impressed by them. We visit a new country and the novelty of the superstition or lie arrests our attention and we moralize about it.



Baskets with Paper to be burned at Grave.

At one side of the court-yard was a high, narrow opening having two doors, one off its pivots. This led into a narrow yard surrounded by high walls. The ground of this yard was paved with stone, and against one of the walls was a brick pen, 4 feet wide, 15 feet long and 3 feet high — very much like a cellar coal-bin. This was filled with earth and represented the flower-garden of the estate, doubtless an attractive feature in the summer, but now presenting only a few dry stalks and dead leaves. It certainly looked dreary enough. Two little children from the neighborhood had kept close by me during my rambles and by pantomime expressed a wish to be sketched. Afterwards one of these little fellows made certain motions to my host, at the same time pointing to his companion's head. I inquired why he was gesticulating in this way and was told that he was trying to tell us not to go near the boy, as he had parasites in his hair, and he was warning us as quietly as he could so as not to offend his friend. In this act there was certainly betrayed some sense of cleanliness as well as consideration for his friend's feelings — a trait for which the Chinese have been given little credit.

While in the house I was somewhat surprised to have an opportunity to sketch a slave. Those who are familiar with the literature of China know, of course, that servants are bought and sold; yet to see a veritable specimen of humanity that had been bought like a piece of merchandise was, to me, a novel experience. My host brought the girl into the room to be sketched and informed me that she had been purchased in Canton some years before. The price paid was $60 in our money, but with the instructions she had received in household duties (which certainly did not include sweeping and cleaning) she was worth at least $200. In thus holding the girl as a slave the master conditions that she shall be married off when of a marriageable age. How meekly this poor creature stood when I sketched her; patient, apparently uncomplaining, literally knowing nothing about her antecedents, doomed to work and slave as long as life lasted, whether single or married. With the degradation of women in China it is possible that her lot might be considered far happier than that of her mistress in that she had her two good feet to stand upon and could see the activities of the street without impropriety. It was, indeed, a hard lot. The old African slave, with his dances and songs, freedom in the open air, and 'possum hunting on a moonlight night, might be considered in a state of bliss and wildest freedom compared to the lot of a female slave in China.

After ransacking the house for an hour or two, dinner was announced. The table, for some reason, probably on account of the clutter in the dining-room, was placed in the study. It was of dark polished wood, 4 feet square, the legs square and slender, with the curious open-work between them, so characteristic of Chinese furniture. A seam ran through the top of the table where the two boards joined. In seating guests etiquette requires that the seam should run at right angles with a line drawn between the host and guest. We were four in number and the first guest of honor sits directly opposite the host, the next in honor sits at the left of the host, while the third guest sits directly opposite the second guest, and, of course, to the right of the first guest. Women are excluded from the table as in Japan. The tables are not placed together, but, if there are more guests, additional square tables are provided, which are placed in different parts of the room; probably definite places are assigned to them, though about this matter I failed to inquire.

Wine and oranges were first offered us; the wine a *sake*, much finer than I had drunk in Japan. The dishes of food were placed on the table in a radially symmetrical manner. No plates or individual dishes were provided until the rice was served, and then each one had a bowl to himself. Each one helped himself to whatever he liked from the assembled dishes. In one dish was a fish with rich gravy, and each person picked in turn from it. This, of course, is done with the chop-stick, and my ready use of these "nimble lads," as they are called in China, led my host to remark upon it. Following is a list of the articles of food which we had for our dinner, with my brief comments recorded at the time: —

Water-chestnut. Crispy and interesting.
Peanuts, fried in oil, served cold. Delicious. (Will fry peanuts when I get home.)
Watermelon seed. Indifferent, and one wonders what the Chinese find of interest in the diminutive morsel within.
An uncooked goose's egg, four years old. Ghastly.
Salted chicken, cold. First rate.
Salted pork. Fairly good.
Clover-leaf and bamboo. Not unlike spinach. Delicious.
Fish with rich gravy. Delicious.
Shark's fin, a gelatinous mass. Delicious.
Fermented bean-curd soup. Very poor.

I was surprised to find that nearly all the articles of food were not only good but appetizing so long as the recollection of the kitchen did not obtrude. In justice it should be said that not one speck of dirt or foreign substance showed itself in the various foods; no suspicious fragments of an insect, no gravel in the clover-leaf, as one often finds at home in his spinach and lettuce. With the usual reversal of things Chinese, the kitchen is dirty, while the food is clean. Judging from the first experience, Chinese food resembles in taste our own far more than does that of the Japanese. One has to acquire by practice the enjoyment of many kinds of Japanese food. Of course the foreigner takes at once to the Japanese raw fish, with its sauce, which must have been specially created for the fish; the rich custard-like *chawan-mushi*, the fried eels, and many other delectable preparations. The Chinese food appeals to one at once. The fish, with its rich gravy, and the salted meats were not unlike ours, the salted chicken was remarkably good, and I would suggest to our farmers that they prepare a barrel of corned chicken just as they prepare a barrel of corned beef. Chicken and turkey might easily be preserved in this way for transportation.

While gnawing my chicken I wondered what I should do with the bone. It would not do to lay it down on the polished table-top, I certainly was not expected to return it to the communal platter, and there was no individual plate, so in despair I was constrained to ask my host, and he told me to throw it on the floor, which I did. Indeed the floor, judging from its appearance, fulfilled the function of slop-pail, cuspidor and garbage-barrel combined. When one considers the dirt tracked in from the street on a wet day with no conveniences for removing it before entering, it will be readily understood that the débris from a dinner would add little to the dirt already accumulated. In some ways one was reminded of the savage Ainu hut, where the inmates eat out of the same dish and fling the bones on the earth floor. The conservatism of the Chinese must have begun back at the dawn of their emerging from quadrupedal ancestors; for this reason one finds projected into their present life many archaic survivals. Their fiendish cruelty; their innumerable childish superstitions; their propitiation of unseen evil spirits and influences; their filthy manners, and, above all, their absolute indifference to ascertain the causes of phenomena must be regarded as survivals from their prehistoric savage ancestors.

The goose's egg was a revelation to me, and the dainty way in which my Chinese friends ate crumbs of this awful substance probably has its parallel in the way we nibble our stronger cheeses. The raw egg is allowed to go through every stage of fermentation, putrefaction and whatever other unimaginable processes of putridity it might venture upon. These changes take place while surrounded by a thick coating of clay. The egg may be one year old or ten years old; conceive for a moment a rotten egg even four years old! It resembled a green variegated soap and had a greasy crumble to the touch and tasted as one might imagine the condensation from the inside of a charnel-house might taste. It was ghastly and one taste of it lasted me a week. My Chinese companions were nibbling crumbs of it, not mouthfuls, as I observed. On my expressing a certain amount of horror at the idea of eating a rotten egg four years old they quite justly reminded me of our Rochefort, Brie and Limburg cheeses, equally ghastly to them. They were evidently familiar with the processes of making our stronger cheeses, for my host recalled the process of cheese-making by saying, "Which is worse; a fairly rotten egg three years old which has never been removed from its first shelly enclosure or a liquid substance derived from a modified sebaceous gland of a cow to which is added the active principles of the gastric juice of a young calf?" He further went on by reminding me that in the case of the stronger cheeses this stuff is put in a skin bag and buried in lime, so that it will not go entirely to the dogs; in the case of Limburg it is actually permitted to putrefy. Some of the cheeses are kept a year or more, and we do not hesitate to eat them when green with mould, as in Rochefort, and even fly-blown, with wriggling maggots within, and yet smack our lips over them! I had nothing to say and had to confess that a bad egg three years old was a fresh dainty tid-bit in contrast to the substance he had so graphically depicted.

Returning to our menu, I would suggest that our people learn to cultivate the delicious clover-leaf, ginger-shoots and other delightful forms for our salads. Ginger might be successfully cultivated under glass, and the young shoot is most delicious.

After dinner we left the house by a back-door and passed through a large back-yard. In this yard was a huge mound, at least 25 feet high, composed of brick, plaster, broken roofing-tiles and ashes. I thought at first it corresponded to the *Ko-yama* (little mountain) of the Japanese garden, but was told that, years before, an extensive conflagration had occurred in the neighborhood, consuming many of the houses, and the débris of this calamity had been gathered here as the only available place for its disposal. By what right this huge pile of rubbish had been placed in this particular back-yard I did not learn, but reflected that there was no other place that it could be carried to. It could not be thrown into the shallow river, as it would impede navigation; all the land surrounding the city was under cultivation or occupied with the innumerable sepulchral mounds; it had to be piled somewhere, and as this was the only open lot in the vicinity it was piled here. On the top of this mound two depauperated trees were struggling for existence, and from this vantage-point in a raw, cutting wind I secured a sketch of the house-tops in the immediate vicinity. How the Japanese would have utilized for beauty a mound of this size, and yet here was this pile of rubbish without even steps, and the two trees on top were evidently fortuitous. The house-tops present a somewhat uniform type of architecture and reach a nearly uniform height, with small, low chimneys. The walls were of brick and plastered outside, forming a marked contrast to the thin wooden and inflammable buildings of the Japanese. The ridges of the roof were ornamented with flat tiles placed on end as books are arranged in a rack and apparently without being fastened; at the ends of the ridge iron pieces were turned up against which the tiles rested. The firmly turned gables and heavily tiled roofs gave an appearance of solidity and durability.

A short walk from the house brought us to the jail, always described in books as an inferno. It was certainly a painful place. Here were collected a number of malefactors, dirty and dejected-looking vagabonds. There were two thieves in low wooden cages. The worst-looking device was an arrangement in the shape of a high wooden cage in which the criminal is imprisoned for a certain time. His head is secured through a hole in a plank which stands vertical and forms part of the cage. Friends are allowed to feed him, otherwise he would be permitted to die of starvation. He cannot lie down and if he drops to sleep has to hang by his head. This probably gives him but slight annoyance, however, as the Chinese absence of feeling is such that they are said to endure the most frightful surgical operations with little manifestation of suffering. One authority, in describing their peculiar insensibility in these matters, avers that a Chinese can sleep soundly while reclining across the top of a wheelbarrow with head bent back at right angles, mouth gaping and full of flies. However this may be, the annoyances that set most of us frantic do not seem to disturb a Chinese in the least. The punishments are frightful in their cruelty. My companion admitted that the wealthy and influential often escaped the severer penalties imposed by the law. He further told me that in case of matricide or parricide every

member of the murderer's family, including all the generations from great-grandfather to nursing infant, are put to death. Even the first-cousins are sacrificed and a school-teacher is impartially included, as he was influential in the formation of the boy's character. On expressing incredulity at such monstrous acts of injustice my informant insisted that this comprehensive punishment had been inflicted within ten years.

Coming out of the city gate that night I saw an emaciated beggar lying prone in the mud and slush at the side of the crowded thoroughfare. He was trembling and apparently in the last stages of dissolution; an empty basket was beside him for the pittance he hoped to attract by his pitiable condition. In that hurrying throng no one seemed to notice him. Such heartlessness was difficult to understand until one learned that if any one rescued such a case he would be held responsible for the man's debts and, possibly, for his crimes. It was certainly a shocking sight.

Such dirty booths as we passed with such dirty food for sale! Among the common classes, at least, there seems to be no attempt to make the food look tasty and attractive as in similar places in Japan. All of the messes not only looked unsavory, but some of them appeared positively disgusting. EDWARD S. MORSE.

[To be continued.]

ROMAN AND ROMANESQUE FRANCE. — I.

LYONS.

FRENCH folks are eloquent in their criticism of London fog and the British climate in general, and with reason; but at the same time it is well now and then to look at home when criticising our friends, their ways and their works. Thus it has befallen me to visit Lyons on two occasions, each one in springtime, when one expects

Interior of St. Nizier's, Lyons, France.

in most parts of France to meet with fairly good weather; but Lyons seems to be an exception, and, be it not told in Gath, one's friends, whose misfortune it is to dwell in or near that city, give it a very bad character in its climatic arrangements. My experience is no better. I have been told by my *Murray* that one can see Mt. Blanc from Notre Dame de Fourvière; well, I have, like the pilgrims, climbed that mountain on foot, but nothing have I beheld but fog — fog below, fog above, fog everywhere. Yet, in spite of mist, mud and misery, the city impresses one by its situation and its fine rivers, which meet at one end of it, but are no more reconciled than the Catholics and the Free-thinkers, of which Lyons has not a few. It is a city of squalor and handsome houses, of beggars showing every deformity and masses of sores, and business men who certainly look well-to-do. Almost prehistoric carts rumble along and get in the way of steam-trams, as in most French towns — probably it is considered now a work of supererogation to reform the former while motors are, metaphorically, in the air; and just as the Rhone and the Soane march along side by side, the one exquisitely clear, clean, transparent and limpid, the other muddy, dirty and squalid, so the new church on the top of the hill asserts itself in all its blatant meretricious architectural taste, while beneath it a little gem of antiquity nestles in between some quiet streets, almost unseen, and, so far as I could discover, its tower only has been photographed. This relic of the great Abbey of Ainay possesses four huge granite columns, which may have belonged to the altar erected by the Gauls at the confluence of the two rivers (which originally joined their forces near the Abbey) in honor of Augustus, who resided in the city for some years. The pillars were evidently cut in two to form supports for the central cupola, probably in the twelfth century, or earlier, for the foundation of the church dates back to the year 937, and the monastery preceded the present building. The crypt is of the ninth century, and below the sacristy are some dungeons where Pothinus and Blandona were imprisoned before their martyrdom under Marcus Antoninus in the year 177. The bishop died in the dungeon; Blandona, the slave, suffered a worse fate in the amphitheatre, torn to pieces by wild beasts, bathing the soil of Lyons with her blood, as afterwards was the fate of Catholics and Protestants under kings and commoners. Possibly, few cities have seen more blood spilt upon her soil than Lyons. Political quarrels, religious squabbles, the modern strikes, have all furnished her history with martyrs.

It is said that the Augustan altar above referred to included a school of debate, or athenæum, and that unsuccessful candidates for its honors were beaten, thrown into the river like their successors under the Convention Nationale, or made to lick out their rejected effusions with their tongues. Thus Lyons began early in life to soil its history with various kinds of atrocities.

The church of Ainay has been much restored, but one can trace Roman brick intermingled with stone, and the form, as well as the terra-cotta ornament of the tower, are presumably Carlovingian.

The position of Lyons, surrounded by rivers and almost encircled by hills, must be most beautiful on a fine day. The highest point is crowned by the votive Church of Notre Dame, occupying a site which has been held sacred from the earliest periods — Forum Vetus (Roman), Fort Viel in the fifteenth century, and Fourvière in modern times. The only interest in the church itself is its profusion of good materials — marbles, mosaics and paintings offered by the devout instead of tablets or miserable works of art (?) such as one sees in most churches and chapels devoted to miracle-working saints or Our Lady. Here all is sumptuous and costly, if in bad taste and approaching the vulgar; but if it be possible to propitiate the Almighty for the sins of their ancestors by the practice of self-denial, the Lyonnais have certainly left nothing undone as regards wiping out atrocities unnamable by a costliness equalling that of Solomon's Temple.

The church occupies the exact site of the Forum Vetus erected by Trajan. Roman remains have been unearthed during the necessary excavations for the modern church — notably some arches of an aqueduct at the fort of S. Irénée. The modern church bearing that saint's name was erected upon the spot where she suffered martyrdom, and in the vaults the traveller may picture to himself the spot where the early Christians worshipped and suffered under Septimius Severus in 202. The Calvinists destroyed the older church, but in the crypt may be seen a well down which, it is said, the bodies of nineteen thousand martyrs were thrown, "until the blood overflowed," as saith tradition.

In the cloister of the Museum (the ancient Convent of S. Pierre, of which the church with its Romanesque portal is all that remains) are many marbles, fragments of votive tablets, *cippi*, altars, pavements and other Roman "documents." Also the bronze tables upon which we read the speech made by Claudius in the Senate (A. D. 48) when he moved that the people of Gallia Comata should be enrolled with the privileges of Roman citizens. (Claudius was born at Lyons on the day that the altar of Augustus was set up.) One of the pavements represents the gates from which chariots issued for the races; another, the taming of wild beasts by Orpheus. In the picture-gallery is the famous Perugino which was "given" to the city by Pope Pius VII; in other words, it formed part of the loot which Napoleon ordered to be carried off from Perugia, and which by sundry and divers subterfuges was withheld from the general restoration of works of art to their rightful owners by the Allies.[1]

In the suburb of Vaive may be seen all that remains of the great escarpment cut, *incisa*, by Agrippa for his military road. Here also stood the castle of the Archbishops (which was practically a prison) demolished during the Revolution. In it Il Moro (Ludovico Sforza) was confined by Louis XII before he was removed to Loches, where he died of cruel treatment. Cinq Mars and De Thou[2] were also imprisoned in the fortress, from which they passed to execution in the Place des Terreaux.

Lyons possesses in its Hôtel Dieu the oldest hospital in France, founded by Childebert, but remodelled by Soufflot, the architect of the Paris Panthéon, and later architects. Its plan is a Greek cross, with an octagon altar under the central dome, which may be seen from each ward. Upon a hill below Notre Dame de Fourvière is another interesting hospice, that of L'Antiquaille, which occupies the site of the Roman palace where Claudius and Caligula were born, and was a part of the ancient city of Lugdunum (Lucei Divnum), founded by Munatius Plaucus (B. C. 40), and the residence of Augustus and Severus.

The aqueduct, constructed by the soldiers of Marc Antony to supply the town with water from the mountains of La Forez, may be

[1] See *American Architect* for March 16, '01, "*Perugiano.*" By G. C. Williamson.
[2] A long account of their execution is given in a novel by Alfred de Vigny.

traced for miles by its broken arches, the most important fragments being at Bionnat, Chapponoet, Chardonniers and Oullins. (Of this fact I cannot add my own testimony in consequence of fog and rain.) Agrippa's four great roads radiating from Lyons to Marseilles, Paris, the Pyrenees and the Rhine may also be traced. The church of S. Paul is an interesting Romanesque building with additions of thirteenth to fifteenth century styles, the Flamboyant predominating. The interior has the original round arches, solid single-shafted columns and an octagon cupola, but, being given over to restorers, close inspection was difficult.

S. Nizier's is also interesting, showing Flamboyant details built on to a thirteenth-century foundation. The bays of the nave and the clerestory are part of the original church, the Flamboyant triforium having the appearance of being wedged in between them. The west front has a specimen, a still later style, patched on, a very fine but quite incongruous portal by Philibert de l'Orme.

Note also the Romanesque portal of S. Pierre with its billet moulding and the remains of an arcading in the same style on the west side of the archbishop's palace.

The Cathedral and other buildings (Hôtel de Ville, etc.), though most noteworthy and interesting in their distinctive styles, do not come within the scheme of this article. S. BEALE.

[To be continued.]

EDWARD R. SWAIN.

THE architectural profession on the Pacific Coast has suffered the loss of one of its leading members. Edward R. Swain, Fellow of the American Institute of Architects, died suddenly April 10, in San Francisco, where he was born fifty years ago.

He received his professional training in the office of David Farquarson, at that time the most prominent architect of his native city, and started some twenty-five years ago in the practice of his profession. Without academic training and having spent his entire life, with few interruptions, on this coast, he succeeded in associating his name with a number of buildings which stand out as attractive features in the rather uncouth architectural physiognomy of the Queen of the Pacific. He no doubt possessed in himself, and could detect and use in others, that complex compound of qualities which makes the good architect and manifests itself in buildings of fitness, substantiality and beauty.

The structures which constitute the life-work of Mr. Swain make impressive the fact that he had the peculiar gift to treat the material and to express the purpose of a building in a truly characteristic manner. All the buildings in which he had a chance to show his metal are good in sense and taste, and particularly free from sham. This deserves special acknowledgment in view of the fact that the majority of the architects in California in order, no doubt, to gratify the undeveloped tastes of their clients, fake wood, tin and plaster into all kinds of strange materials and unwarranted forms. As his chief works, in consequence of their substantial character, will enjoy a long life, the good example given by Mr. Swain will permanently benefit the profession on the coast.

Among the notable commercial and public buildings he has designed are to be mentioned the H. S. Crocker Building and the Hobart Building, both in granite, limestone and brick, well blended in color, the Goldberg-Bowen & Co. store building, the Park Lodge in Golden Gate Park, all excellently treated in form. After the death of Mr. A. Page Brown in 1895 he was called in to re-design, superintend and complete the Ferry Building, the largest structure of its kind in the world. Its tall clock and light tower, seen from nearly every point of the bay and the city, forms a conspicuous landmark, and its graceful outline stands to the credit of Mr. Swain, who took considerable pains in its re-designing. He was further prominently engaged in the architectural creation of the Midwinter Fair of 1894, for which he designed the highly picturesque Mechanical Arts Building in Indo-Persian style.

Praise is also due for his residential work. A great number of good, comfortable dwelling-houses all over the coast have been built after his designs, of which Mr. Wm. F. Whittier's residence ranks easily among the most substantial, best appointed and most refined in San Francisco. At the time of his death he was chiefly occupied with plans of a palatial residence for Mr. F. W. Macfarlane in Honolulu, where in the last years he erected a number of extensive commercial buildings, factories, etc.

In the prime of life and in the midst of a fruitful activity his career was cut short. In premonition of the fatal issue of an operation which a complication of diseases made necessary, he bequeathed his rich library and well appointed offices in San Francisco and in Honolulu to Messrs. Clarence R. Ward and Walter E. Pinkham, his professional associates for years, now his successors in California and in Hawaii, respectively.

Edward R. Swain left this world mourned by all who knew him intimately as a thorough gentleman and a dignified representative of his profession. M. J.

SAN FRANCISCO, CAL., April, 1902.

THE CITY OF MEXICO'S SEWERAGE SYSTEM. — By the end of this year the capital of Mexico will have a sewerage system covering the whole city. — *Exchange.*

SOCIETIES

DETROIT ARCHITECTURAL CLUB.

AT the annual meeting of the Detroit Architectural Club held at their rooms in the Union Trust Building on Monday, April 14, officers for the ensuing year were elected as follows: *President*, Cheri Mandelbaum; *Vice-President*, George H. Ropes; *Secretary*, Edward O. Schilling; *Treasurer*, John J. Fraunfelder; *Directors*, John Gillard, George V. Pottle and Adolph Eisen.

The reports of the officers and committees proved the Club to be in good condition.

At this meeting the criticism by F. B. Stratton on the Club's competition for a permanent band-stand at Belle Isle was announced, awarding to Louis W. Klei First Mention. On Tuesday following the meeting, the Entertainment Committee arranged for a theatre-party, after which a lunch was served at the Hotel Richter.

On Monday evening, April 23, a special meeting of the directory was called at which the committees that arrange the Club's work were elected: —

Class Committee: G. H. Ropes, *Chairman*, George V. Pottle and Edward A. Schilling.

Entertainment Committee: John G. Gillard, Fred Barnes and W. J. Ireland.

House Committee: John J. Fraunfelder, Adolph Eisen and John Mayer.

Publicity Committee: Adolph Eisen, *Chairman;* Louis W. Klei and Hans Geheke.

The Class Committee has arranged for a sketch-class in water-color during the summer months. The class will meet every Saturday afternoon.

All communications to the Secretary to be addressed to Edward A. Schilling, 48 Peninsular Bank Building, Detroit, Mich.

A. EISEN, *Chairman, Publicity Committee.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

STORE OF R. H. MACY & CO., HERALD SQ., NEW YORK, N. Y. MESSRS. DE LEMOS & CORDES, ARCHITECTS, NEW YORK, N. Y.

HÔTEL DE VILLE, LYONS, FRANCE.

NOTRE DAME DE FOURVIÈRE AND THE CHURCH OF ST. JEAN, LYONS, FRANCE.

VIEWS IN LYONS, FRANCE: — THE PLACE BELLECOUR; THE PALAIS DE JUSTICE AND THE SLOPE OF FOURVIÈRE; INTERIOR OF NOTRE DAME DE FOURVIÈRE; THE CHURCH OF ST. PAUL AND THE CHURCH OF ST. MARTIN D'AINAY.

SEE article "Roman and Romanesque France" elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

FUNERARY MONUMENT, BOUGÉ-CHAMBALUD, ISÈRE, FRANCE. M. E. JAUDELLE, ARCHITECT; — COMMEMORATIVE MONUMENT, CHARTRES, FRANCE. M. H. P. NENOT, ARCHITECT.

THIS plate is copied from *La Construction Moderne.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A CORRECTION.

SPRINGFIELD, MASS., May 7, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In the last issue of the *American Architect* the alterations of three Colonial churches were credited to Messrs. E. C. & G. C. Gardner. As the work was executed before the firm of Gardner, Pyne & Gardner was dissolved the credit should have been given to the latter firm. Yours truly, E. C. & G. C. GARDNER.

NOTES & CLIPPINGS

PICTURE RESTORING UNDER NAPOLEON I. — "A Visit to Paris in 1814," by John Scott, Editor of *The Champion*, contains the following: M. Hacquin could not be content only to clean Titian's picture of Pietro Martire, but he must lay it on its face and plane away the board till he came to the actual color. He then put down pasted and glued canvas, that stuck to the color, and thus transferred the picture from wood to canvas. The members of the Institute were in an agitation of delight as this curious trick was in progress. "*Sacré Dieu!* What an undertaking!" An eye or a toe, a white cloud, a speck of color, on which much of the effect of this inestimable performance of the Venetian depended, was as nothing to the dexterity of the French remover. M. Hacquin was made a member of the Legion of Honor, and the whole body of artists and literati ran with wonder — not to study the picture of Titian . . . but to chatter, to shrug, to take snuff and to express admiration of the talents of M. Hacquin. The whole system of this cleansing and restoring is hateful. . . . An English artist told me that he was in the Louvre, studying the cartoon of the "School of Athens," when from a private door came forth an old Frenchman, who regularly set his palette and began to work on a large picture, the back of which was toward the Englishman. The latter thought it must be the performance of the person who was so busily employed on it, and from curiosity went over to examine it. To his horror he found the Frenchman engaged in regularly painting over an early and curious specimen of Italian art, touch by touch. He had painted the drapery of the Virgin entirely over, a fine staring blue. "Good God," said the startled Englishman, "who is this picture by?" "*Je ne sais pas, Monsieur,*" was the reply. "*Je ne suis pas peintre — Je suis Restorateur!*" It afterward turned out that this painting, so honored by the attention of *Monsieur le Restorateur*, was by Cimabue, and a most rare and singular relic. — *Notes and Queries.*

FACTS ABOUT LIGHTNING. — Many people admit, and more experience without admitting, fear of lightning. The feeling ranges all the way from vague uneasiness to frantic terror, and the aggregate amount of mental discomfort thus caused is very large. The *Electrical Review*, in noting the approach of the thunderstorm season, calls attention to the disproportion between the popular apprehension and the actual danger, but there is small consolation in that for the timid ones, all of whom know that the number of deaths from lightning is a negligible fraction in mortality reports, and still they are afraid. The *Review* disbelieves utterly in lightning-rods: at least it says that, "as usually put up, they are of practically no use." A tin roof, with metallic spouts connected with underground pipes, it credits with some protective power, but for the dweller in the country no close approximation to safety is attainable. The urbanite, on the contrary, is in no measurable peril, even if he takes no precautions at all, for, though city buildings are often struck, in hardly any instance does serious harm follow. It is well to avoid trees during thunderstorms, and stables containing animals and barns filled with new hay are also to be shunned. It is important to know that people are rarely killed outright by lightning. Many who die from its effects would recover if resort were had to artificial respiration, long continued. The production of lightning is thus explained: "When clouds are formed by the condensation of very minute drops of water from the vapor in the air, under certain conditions these drops exhibit a small electrical charge. As the drops coalesce the capacity increases less rapidly than the quantity of charge, for the reason that two drops of equal size, when they flow together, produce one of only slightly larger diameter, and the capacity is determined by the diameter. On this account the drops formed by the flowing together of the small mist particles, long before they attain such size as to be precipitated as rain, acquire an electrical charge of enormous voltage, sufficient often to leap a distance of a mile through the air."

THE STATUE CRAZE. — Boston just now is in the midst of a craze for statues, and the Legislature is flooded with bills making appropriations for them. Statues of ex-Governor Andrew, of Governor Wolcott, of John Hancock, of General Butler, besides a memorial monument to the Pilgrim Fathers at Provincetown as an offset to the monument on Plymouth Rock, upon which, say the Cape Codders, the Fathers did not first land, and other statues and monuments are called for from various sections of the State. Boston has always been well supplied with statues, such as they are, but of late its Art Commission has so impressed the municipal authorities with the badness of the statues that most of them have been kindly given to the suburban towns. This has left many sculptural vacancies, which it is now proposed to fill at the State's expense. The situation gives the Boston *Advertiser* the opportunity for a wholesome and sensible suggestion which might be heeded in many States besides Massachusetts. It says: "The State has no business to tax the people for monuments to dead men. Their relatives and friends should foot all the bills." And again: "The State might, perhaps, erect a monument to an idea, to a principle, but it has no business going into the mortuary-monument business when the dead man has friends who are perfectly able to meet all the expenses." Of course, if the suggestions were generally carried out, there would be fewer statues, but there would be compensation for this in the fact that there would be fewer bad statues. The good statues, like angels' visits, are few and far between. The bad statues are everywhere. Why should the State spend the money of the taxpayers to add to the number? for the statues secured by State appropriations are usually the bad ones. There is one exception to this general rule. In the case of a great national hero like Lincoln or Washington there could be no objection to Congressional appropriation for a statue, provided the conditions were such as to secure artistic work, but even in such a case a memorial set up by voluntary popular contribution would be preferable. But in the case of persons of State or purely local fame, if their friends wish statues erected as memorials of them they should foot the bills and not expect the whole people to contribute. Under any circumstances there is no danger of a statuary famine. What with individual gifts and bequests and collective contributions of societies, corporations and local communities, the supply of good, bad and indifferent statues will be kept up. There is no need for the State to add to the number. There is greater need for competent judges to examine the stock on hand and see how many are candidates for the dump or melting-pot. — *Chicago Tribune.*

VALENCAY. — Valençay is in the former Province of Berry, in the full centre of France, continuing the region frequented by all lovers of noble architecture for what are known as the Châteaux of the Loire. The château with its immediate dependencies — park and kitchen-garden, seed-plots, and pruning-grounds, and the largest of the eight forests — comprises over 7,000 acres, with an annual revenue, for the past twenty years, of some $14,000, of which $12,000 came in through the forest. Valençay was originally only the *seigneurie* of the Etampes family, belonging to the little nobility; but a marquisate came into the family, and there was an intermarriage with the Montmorencis, and so — three centuries ago — the owner tore down the old constructions, which were unfashionable in their Gothic rudeness, and built anew from plans of Philibert de l'Orme, who had just given the Tuileries to the critical Queen Catherine de Medicis. The château is built in a right angle, the other two sides of the square being completed by terraces of flowers and the orangery. The half-court of the traditional château, with its dark, damp corners where the two wings project from the main building, was thus avoided. The ancient moat surrounds the great building, and there is a donjon four stories high through which entrance is made from what was once the drawbridge. The exterior is sumptuous and majestic. The lofty windows and sculptured friezes were not surpassed during the French Renaissance, except at Chambord; if the latter is better known, it is because Valençay is off the line of tourist travel, and has never been open to visitors. Inside, besides the show-rooms and two libraries, there are twenty-five suites of rooms for the "masters," a chapel, and a vast number of separate rooms. The surrounding park, one of the most beautiful in France, covers 200 acres. The avenue leading up to the château is now the great high-road from the railway-station of Selles, and for a great distance its perspective is closed-in by the noble building, with its donjon and towers, and pointed roofs, with its cupolas and high decorative chimneys in the picturesque taste of the day. — *S. D. in the N. Y. Evening Post.*

A CONCRETE FACTORY-BUILDING. — A factory-building, five stories high and occupying a site of 50 feet by 25 feet has recently been completed in Jersey City, having the foundations, walls, floor-beams, girders, and roof made entirely of armored concrete. The building contains about 500 yards of Portland-cement concrete, and 12 tons of twisted steel rods, varying from ½ inch to 1 inch square. The ground-floor is supported about 5 feet above ground-level on foundation-walls with expanded bases of sufficient area to reduce the pressure on the unstable soil to 2,000 pounds per square foot. All the floors are designed for loads of 250 pounds per square foot, and each consists of a continuous concrete slab, 4 inches thick in the case of the ground-floor, and 2½ inches thick in all other floors, finished with a ½-inch granolithic surface. The floor-joists on the ground-floor are of steel-concrete, 26 inches from centre to centre, and measure 4 inches wide by 20 inches deep. They are flush with and supported by beams of similar material and depth, but 6 inches wide, each made in two lengths, so as to provide for expansion. On the upper floors the joists and beams are of lighter construction, and flanges are moulded on the lower edges of the joists to carry wooden beams, to which hangers for shafting may readily be secured. Twisted steel rods are carried through all concrete work, and the lower portions of the joists and beams are strongly reinforced in this manner for withstanding tensile stress. The steel rods are joined together by means of sleeve-nuts, and so continuity of support is secured. This factory-building is interesting as an example of concrete construction, but the adoption of concrete joists and beams seems to offer little advantage, while the great depth of such members would frequently be a distinct drawback. — *The Builder.*

A REVIVAL OF STREET-SIGNS FOR THE CORONATION. — There will be at least one symbol in Lombard Street worthy of the best traditions of the financial centre of the British Empire. This is the sign of the golden grasshopper from the family crest of Sir Thomas Gresham. He was an Elizabethan goldsmith, dealing in plate, jewels, coins and lace; and until he was knighted he lived over his shop in Lombard Street. He was a banker and a money-lender, and he charged percentages which would excite the envy of modern pawnbrokers. He had correspondents on the Continent, to whom he commended English travellers with letters of credit; and he exchanged foreign coin and melted down bullion for recoinage. He was an eminent financier, who enjoyed the confidence of the Ministers of Mary and Elizabeth; reduced the enormous charges of the bankers of Bruges and Antwerp in financing royal loans by inducing Londoners to take them themselves; built the first Royal Exchange at his own cost as a meeting-place for merchants, and converted London into the commercial centre of Europe. The first London bourse displayed at every corner pinnacle the golden grasshopper of Gresham, and it had classical and mercantile associations, for it was the favorite ornament of the Athenians in their best days, and was identified with the earliest enterprises of Phœnician commerce. There can be no more historic symbol of the worldwide activities of the financial resources of modern Lombard Street. — *I. N. F. in the N. Y. Tribune.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, MAY 17, 1902 No. 1377

CONTENTS.

SUMMARY: —
The New Department of Fine-Arts at Columbia University. — The Massachusetts Institute of Technology to move some of its Departments to Brookline. — Why the Architectural Department must remain in Boston. — Mr. Atkinson's proposed School of Insurance Engineering. — Differing Expert Statements concerning Steel and Concrete Structures. — Postponement of the Louisiana Purchase Exposition. — The Volute of the Ionic Capital. 49
JOURNAL SKETCHES IN CHINA. — III. 51
STRUCTURAL COLOR-DECORATION OF THE INTERIOR OF PUBLIC BUILDINGS. — III. 53
THE EXHIBITION OF THE BOSTON ARCHITECTURAL CLUB. . . . 54
ILLUSTRATIONS: —
United States Court-house and Post-office, Indianapolis, Ind. — Front and Rear Elevations of the same Building. — Detail of Entrance Pavilion of the same Building. — Detail of Main Colonnade of the same Building.
Pan-American Exposition, Buffalo, N. Y.: — The Temple of Music, from the Court of Lilies; — The Ethnology Building. 56
NOTES AND CLIPPINGS. 56

COLUMBIA UNIVERSITY is taking an important step in separating its Schools of Architecture and Music from the departments to which they have hitherto been attached, and combining them into a new Department of Fine-Arts, to which will be added, later, if the proposed scheme is carried out, schools of painting and sculpture. Although the difference between a school of architecture as a branch of engineering and as a part of a Department of Fine-Arts is, perhaps, one of name merely, there is a certain importance in the definite ranking of architecture as a fine-art, and its students as artists. So far as we know, such a classification has never been made before in this country, and the following of the Paris precedent at Columbia will attract attention from the profession generally. All architects realize that too little attention is paid here, as a rule, to the æsthetic development of students of architecture, owing, no doubt, to a rather Philistine fear of making them "unpractical"; but it does not at all follow that a man who has learned to use architecture as a means of expression is any less likely to make skilful use of his materials; and, in the offices, a thorough comprehension of the qualities of brick, stone and wood is very likely to be found united with cleverness and originality in design. If Columbia University were one of the pretentious little institutions of learning which make their existence known to the public chiefly through the eccentricities of their officers, we should expect to see the classification of its students of architecture as artists signalized more by an abnormal development of whiskers and Rembrandt hats than by conspicuous advance in power of design; but the infantile period of its existence is long past, and neither shaggy curls nor pointed beards will do duty in its class-rooms in place of the hard work by which alone artistic excellence, as well as excellence of all other kinds, is to be attained.

THE Massachusetts Institute of Technology, in part through the liberality of one of its graduates, has acquired a tract of about twelve acres of land in Brookline, a few miles from the location of its present buildings. It is well known that President Pritchett earnestly desires for the Institute a more intimate social life, and freer interchange of thought, than has hitherto been possible, and it is quite likely that the purchase of land in Brookline may be a step in the direction of such a change in Institute affairs as may conduce to the wished-for end. Every one acquainted with the higher institutions knows that universities situated in the middle of great cities have much less of the college life than those more remote, for the obvious reason that a considerable portion of their pupils either live at home or have relatives in the city, and have thus a social circle of their own, entirely unconnected with their college; and the indifference of these to the social life of the college chills all the others. The University of Pennsylvania was, we think, the first of our great universities to provide for counteracting, in some degree, the social attractions of the city of Philadelphia, by establishing an admirable university club-house, where students could meet frequently, find congenial acquaintances, and interest themselves in the affairs of the college; and Harvard University, which, when it was founded, stood in an isolated village, accessible from Boston only by a ferry-boat, or by a circuitous path of many miles in length, has also found it expedient, now that the great city has been brought within a half-hour's ride, to counterbalance, by its beautiful Union, the increasing outside attractions. The Institute of Technology, having been placed, from the first, in the very middle of Boston, and provided with nothing but lecture-rooms and laboratories, has always drawn a very large portion of its students from families residing either in the city or its suburbs, while the others, as the Institute has never possessed anything like a dormitory, have been, necessarily, scattered among private boarding-houses all over the metropolitan district. This system, although unavoidable, has always been objectionable for other reasons, besides its total incompatibility with anything like social university life, and President Pritchett, although he is by no means the first of the Institute officials to appreciate the necessity for a change, deserves the credit of having been the first to break boldly with the tradition that the Institute could only exist in the middle of a great manufacturing city, and to declare that personal acquaintance, interchange of ideas, and the stimulus of sympathy and appreciation, are more important to a great institution of learning than simple proximity to manufacturing establishments. As a matter of fact, the industries with which the Institute is concerned are now scattered all over the world, so that any situation near enough to Boston to obtain supplies with facility would be suitable; while the applied science to which it is principally devoted has almost everything to gain by improved opportunities for discussion and collaboration among students of congenial tastes, and between these and their professors, such as would be afforded by giving the Institute more of the university character.

IT will be said at once that, while all this may be true for the engineering or chemical or biological departments, it does not apply to the architectural department of the Institute, which must necessarily be situated in the middle of a great city. This view of the requirements of an architectural school has prevailed in the Institute for many years, but the reasons usually given for it reduce themselves, on analysis, to two. One of these is that students of architecture should have always before their eyes the examples of the art which can be found nowhere else than in cities; and the other is that the Paris School of Fine-Arts is in the middle of Paris, and that, therefore, all other schools of fine-art, particularly of the art of architecture, should imitate the Paris school so far as they can. That there is something in the first argument cannot be denied. Students of architecture cannot learn their art from books and photographs, without plenty of study of actual work; and a city gives the best opportunity for such study; but the casual observation that a student, preoccupied with his work, gives to the buildings lining the streets through which he hurries to his lectures is of very little value in comparison with the deliberate study, made, if possible, under the direction of an instructor, and with sketch-book in hand, of proportion of stories, projection and profile of cornices and string-courses, modelling of carved ornament, and so on; and a student who lives a few miles from the town can have nearly as much of such study as one who lives within the city limits, while the former, if he can, after he gets back to his room, compare his sketch-book with those of a dozen of his friends, and discuss with them the refined beauties of a good piece of work, has a great advantage over a man who, as soon as his sketch is finished, must hurry off to keep some engagement at home, where, even if it should occur to him to take a second look at his sketch-book, he would have to content himself with his own thoughts in regard to it.

SO far as the Paris School of Fine-Arts is concerned, the main element in the beneficial influence which it exerts upon the whole artistic world is to be found in the sympathy and enthusiasm which prevail among its members, and which President Prichett is endeavoring to develop in the Institute. It must be remembered that, although the School is situated in the middle of a great city, its pupils come from all parts of France, and, indeed, of the world, and comparatively few of them have any social ties in Paris. Moreover, every student in the School must belong to an atelier, and the rivalry between the ateliers in the pursuit of prizes excites not only an interest among the students in each, but an earnestness in criticising and assisting each other, which are of incalculable

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

value. Nothing like this has ever existed at the Institute. Although it has often been proposed by Paris-trained Boston architects to introduce a modified atelier system in connection with the Institute, the plan has never been found practicable. With a more intimate student life, while there would be no atelier rivalries, there might be, and probably would be, with the sensitive and enthusiastic American temperament, a great deal of the friendly criticism and encouragement of the Paris ateliers; while the extension of the mutual relation between American universities, which has been found so valuable, is likely, before long, to give opportunity for a most wholesome and stimulating emulation among students of architecture.

MR. EDWARD ATKINSON makes an earnest appeal to all persons interested in the subject of saving to the community the enormous losses which it suffers from fire to make a contribution toward the comparatively insignificant sum of one hundred and fifty thousand dollars, with which either a separate school, or, what would be much better, a Department of the Massachusetts Institute of Technology, can be equipped and endowed for the purpose of teaching the science of preventing or checking fires. Mr. Atkinson calls this science Insurance Engineering, and if all officers of insurance companies were like him, the name would be an attractive one to the public; but, we are sorry to say, so many people, at least in this country, have suffered from the impudence and dishonesty of irresponsible insurance agents, and from unreliable, not to say swindling, insurance companies, that it will be a long time before the community in general is likely to look with favor on any enterprise which has the name of insurance attached to it. If, however, we can call the new school an institution for the study of the art of fire-protection, it should commend itself to every one. The people of the country are rapidly learning that the money which they spend every year in unnecessary fires would keep them all supplied with boots and shoes, or, as Mr. Atkinson puts it, would more than pay all the expense of conducting the Government of the United States, apart from pensions and the interest on the public debt; while, as he points out, every large fire in a manufactory, or a great mercantile house, throws out of employment, and, in most cases, keeps out of employment, until the establishment can be rebuilt, a multitude of persons, whose loss in wages is not made up to them by the insurance companies, and does not figure in the statistics. The prevention of fires has come, therefore, to have a personal interest to a very large number of people, apart from those who regard it simply as the most important of modern economic problems, and a well-considered scheme for the scientific study of the subject should find, and is likely to find, ample support. As Mr. Atkinson says, the necessity for something of the kind is every day becoming more urgent. While manufacturers, through their admirable mutual companies, are able to protect themselves, merchants who carry large stocks of goods find increasing difficulty in obtaining adequate insurance on any terms, at the same time that costly buildings are being erected on all sides by a system of construction which has never yet been thoroughly tested, and the study of the durability of which could with great advantage occupy the attention of experts.

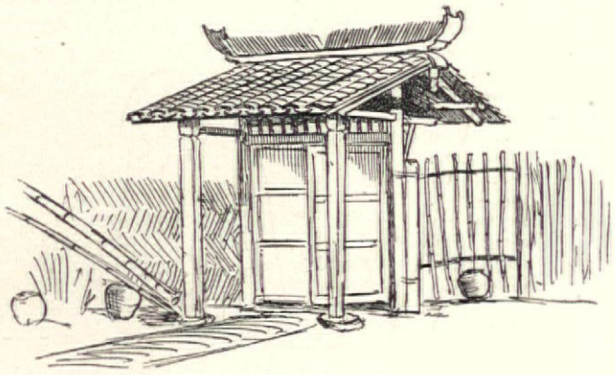
HOW imperative is the necessity for responsible and authoritative investigation of these points is well illustrated by two documents which have, probably, been placed in the hands of most architects within the last two weeks. The first, published as an extract from an address delivered before a body of experts, declared the modern steel-frame construction to be unreliable, quoted instances where steel columns, buried in concrete, when stripped of their covering some twelve years after they were set in place, had been found rusted half through, and warned those interested that no covering of concrete could prolong for many years the life of a steel frame. In a few days this document was followed by another one, also a reprint of an address delivered before a company of experts by a scientific man of distinction, in which it was boldly asserted that, while "opportunity to determine the condition of steel imbedded in concrete after years of exposure to air and moisture is seldom obtained, . . . in all cases in which such work has been taken up and examined the metal has been found bright and free from corrosion." This assertion is supplemented by another, that "even though the concrete be porous, and not in contact with the metal at all points, it will still filter out and neutralize the acid, and prevent its corrosive effect"; the acid being the carbonic acid of the atmosphere, to which, as the author of the address says, the rusting of iron is due. It may be imagined that architects, supplied with contradictory information by experts in whom they have reason to place confidence, find it difficult to ascertain the truth. To them, as to their clients, it is of great importance to know whether steel construction, surrounded with concrete put in with ordinary care, is reasonably permanent, and the opposing views of experts not only confuse them, but injure their influence with their clients, who can always find in technical literature something to contradict the architect's opinion, whatever that may be. With such a school as Mr. Atkinson proposes, this difficulty, which is a very serious one, as all architects know, will disappear, the determinations of its members superseding the *ex parte* deliverances of amiable or prejudiced engineers as completely as, for example, Professor Lanza's determinations of resistance of timber have superseded the assumed constants of twenty years ago.

IT is definitely decided that the Louisiana Purchase Exposition, or, as it is generally called, the St. Louis Fair, will be postponed until 1904. It has long been evident that the opening of the Exhibition next May was impracticable, and the public, as well as the exhibitors, will breathe more freely at the announcement of the postponement. Experience has shown that nothing is more detrimental to the success of such an affair than failure to have it ready on the opening day. Even at Paris, in 1900, the attendance during the beautiful weather which prevailed for a month after the opening of the Exposition was far less than it should have been, owing to the widespread impression that it was not ready. It is true that, on the opening day, and for some time afterwards, many of the exhibits had not been unpacked, but there were plenty of other things to see, and it was a misfortune for the public, as well as for the Exposition, that multitudes of people, in order to be sure that everything should be ready for inspection, put off their visit until the intensely hot weather of June and July made sight-seeing painful, if not impracticable. If the managers of the St. Louis Exposition are wise, they will take advantage of their extra year of time to insist that everything that is to be shown shall be in place, ready for visitors, on the opening day, and that nothing shall be received afterwards. If it is generally known that those who come to the Fair on the opening day will see everything that can be seen by those who come a month later, sensible people will arrange to make their visits as early in the season as possible, and the Exposition will not only have a successful start, which is of great importance, but will be the richer by the entrance-fees of many thousands of people who, if they waited until the scorching days of a St. Louis July before coming, would never come at all.

MR. DANIEL WOOD writes to the *Builder* some interesting observations, which are, however, not wholly new, on the ancient method of drawing the volute of the Greek Ionic capital. It happened to him, some twenty years ago, to be engaged in making a reduced copy of the temple of Nikè Apteros in Athens. In laying out the volute of the capitals, after trying, with the usual result, to draw the curve by Goldman's method, it occurred to him that a pencil, fastened to the end of a string, which was wound around a cone, would draw a spiral, similar to that of the volute, easily and smoothly. He tried the experiment, using a cone with a point, which was set in a hole in the drawing-board, and found that he could draw a very successful volute in this way. As the end of the cone which entered the hole in the drawing-board was of a certain size, he found that the inner revolution of the spiral could not be drawn with the string, and he improved upon his method by placing the cone with the point up, which answered perfectly. On applying his method to copying the volutes of actual capitals preserved in the British Museum, he was surprised to find that a hole existed in the "eye" of each volute in the marble originals of other Greek Ionic capitals, large enough to admit the cone which he proposed to use, with the point up; while, in the capital of Nikè Apteros, the hole was so small that the cone had to be placed with the point down. In either case, however, a pencil and string, unwinding from a cone of a size to fit the hole, described exactly the spiral cut on the marble. In the case of the Erechtheum capital, and some very early examples, there is no hole in the eye of the volute, but it does not follow that a cone may not have been used for drawing the curve, either by holding it against the stone, or by setting it in a shallow hole in the rough block, which was cut away and smoothed over in the finishing.

JOURNAL SKETCHES IN CHINA.[1]—III.

IN the evening we all went to the theatre in the Chinese quarter, outside the city walls. The Chinese theatre in San Francisco gives one a fair idea of the native one in Shanghai, but for rich colors and gorgeous effects of dress and banners, bizarre painting of the



Gateway: Farmhouse near Shanghai.

face and ear-piercing sounds I have seen and heard nothing to compare. I did not tear myself away till midnight and could have remained much longer. The audience-hall was large and spacious, though barny. The floor was covered with small square tables, at which parties of four sat in hard-bottomed chairs. These tables were scattered in an irregular way all over the room. There must have been at least a thousand men on the floor, with not a woman to be seen among them, and I was apparently the only foreigner present. The galleries and floor were packed with an orderly set of people, all talking and apparently paying but little attention to the play. In the gallery, near the stage, were large boxes in front of which were green baize curtains to be lowered in case they were occupied by women of the higher class; now they were crowded with women of the common class, every one with her hair properly arranged in the peculiar and picturesque style of Chinese hair-dressing. Certain portions of the play were shockingly indecent and excited much laughter, yet no one looked to the galleries to see if the women minded it, nor did I see the slightest evidences of disapproval. After we had taken our seats a boy came along bearing a large tray containing dishes of watermelon seed, *li-chi*, fried peanuts, oranges and a weak rice soup. Another boy soon followed bearing in his hand a pile of square pieces of thick quilted cloth; these were wet and steaming hot. Each one took a piece and wiped his face and hands. These had already been in use before being offered to us. I naturally declined to use a cloth that had already mopped the dirty mouths and faces of a number of Chinese and was probably looked upon as extremely fastidious. It is in matters of this nature that the uncleanliness of the Chinese must be insisted upon. My companion told me that the Chinese always used hot water, and not cool, for their faces, and that in the city there were stands where the poorer people could buy hot water for a trifling sum for the making of tea and for other purposes. Still another boy came to our table bearing a tobacco-pipe and a light, and this circulated among the audience. It was often smoked, yet I saw no one wipe the mouth-piece before using. No wonder infectious diseases have full sway among these people. Those who had their own pipes had a slow-match consisting of a roll of paper as big as a candle, and this could be blown into a flame when occasion required.

It was curious to observe the absence of concentrated attention that one sees in our theatres, and, indeed, as a play will occupy some days and even weeks in its presentation, it would be beyond human endurance to sustain the strain of attention. My companions apparently understood but little of what was uttered by the actors and it seemed impossible that the audience did, judging from their lack of attention. It was explained to me that there were long monologues and recitatives of no special interest, the familiarity of the audience consisting in a knowledge of the general plot, or story, and not with the words uttered.

When it is realized that there are many languages and hundreds of dialects in China, a troupe foreign to the immediate locality would be speaking in a tongue unintelligible to its auditors. If the text in Chinese characters could be flashed upon a screen as the play progressed, then from one end of the Empire to the other a fair idea of what was being said could be gathered, by all the scholars, at least.

In the acting there were the same absurd conventionalities that one sees on the Japanese stage. For example, the hero is supposed to ride away on horseback; to represent this equestrian feat he waves his hand in the air, flings his legs over an imaginary horse and then prances — but not off the stage. As in Japan, the woman's part is taken by a man. To get the appearance of the compressed foot of the woman the whole foot is rigidly bound with bands and a small shoe is provided which fits the toes, the actor literally moving about on the tips of the toes, at the same time squeaking in a high falsetto voice. The impersonation is wonderful.

. . . . . .

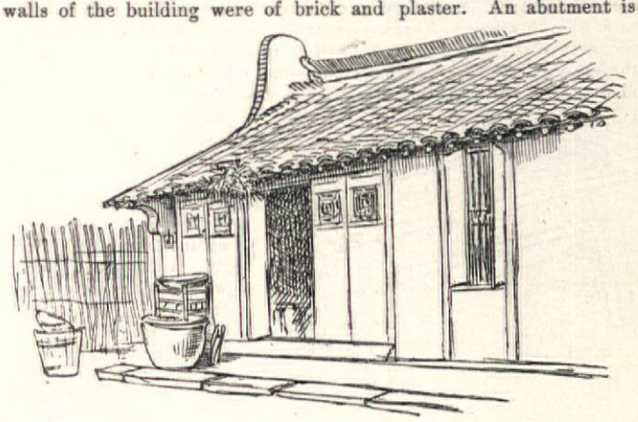
I saw a disgusting sight from the banks of a narrow canal near Shanghai. In the canal were low open barges, like canal-boats, which had been poled or towed down from the interior. These were the receptacles for the sewage of the city, and carriers were coming like a string of ants, bearing buckets of this material, which they had collected in the city from house to house. These were emptied with a splash into the barges, in every case some of the stuff spattering into the river. The canal itself was green and yellow with filth, and yet women were along the banks washing rice, and some were dipping up water in buckets and carrying it away, possibly to water their gardens, and one could not imagine a more generous fertilizer.

Thus far I had seen the interior of three houses of the more favored classes; they were all essentially alike in the high walls, courtyards, rooms and dirt, and I was told that one house would answer as a type for the thousands in Shanghai.

The next day I had an opportunity of walking into the country with Mr. Drew, who was to visit an old nurse of the family. This woman owned a little house on the side of a muddy creek. Whether the house had belonged to a richer person before coming into her possession I did not learn; it was interesting, however, to observe the conspicuous gateway to the yard. The prominent gateway is a distinguishing feature in the Orient. The evidence of taste and time bestowed on the main entrance is not only seen in Japan, but in Anam, the Malay Peninsula, and Java, though in Java there are so many Chinese that this feature may be due to Chinese influence. In our country and in Europe the estates of the wealthy are marked by prominent and conspicuous gateways, while among the masses this is rarely made a prominent feature.

The fence on one side was a ramshackle affair of split bamboo in braided patterns; on the other side simply bamboo poles. The framework of the gateway showed some little carving; the superstructure was heavily tiled and the ridge had tiles placed vertically, as in the roof-ridges already described. The gateway and fence were in the usual dilapidated condition. The house or houses formed three sides of a quadrangle, the fence and gateway bordering the road making the fourth side, the space thus enclosed making a rather spacious yard, which was wet and muddy. There were no evidences of an attempt at a garden, and the yard and surroundings presented a most forlorn appearance. The houses were one story in height, and the roofs were all heavily tiled. The walls of the main house which faced the gateway were wattled and plastered, though this was broken away in spots, exposing the bamboo wattle beneath. The main entrance to the house was recessed, and on the right and left sides of this recess were the doorways, and on each side of the entrance was a window closed by two outside wooden shutters. Wooden hooks were suspended by cords from the overhanging eaves, and on these hooks hung the peculiar Chinese shoe to dry, an indication that the felted sole of the Chinese shoe absorbs water. A mass of straw and twigs was piled up on the side of the house, this material representing the wood-pile. Charcoal is also used as in Japan, but not by the poorer people. For fuel, dead leaves, bits of straw and twigs are garnered along the roadside. The cast-iron kettles are made with the thinnest possible bottoms, in order to utilize every particle of heat emitted from the burning of this light material. In our great country, with its long streaks of Oriental blindness and stupidity in not enacting and enforcing proper laws for the preservations of the forest, it will not be many generations before able-bodied Americans will be seen picking up dead leaves and dried pods along the road in order to cook their dinners.

The accompanying figure presents a view of another building of this group running at right angles to the main house, its end abutting on the road. In this portion was a bedchamber and also a large room for the making of homespun cloth. The little wooden framework resting on top of a big water-jar, and in its turn supporting a shallow pan which had been dropped there, represents a sort of cage in which the baby is confined when sitting on the ground. The walls of the building were of brick and plaster. An abutment is

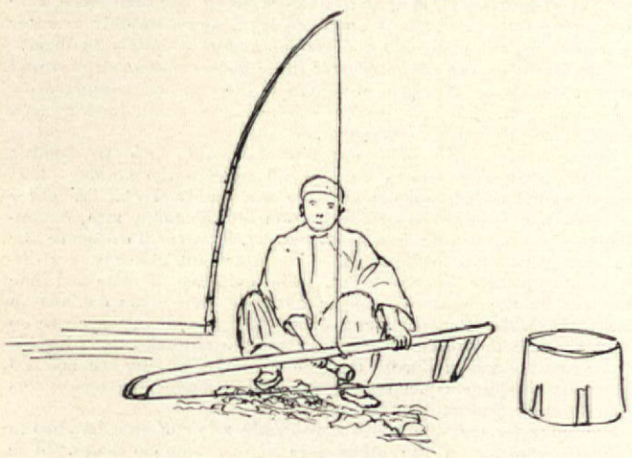


Farmhouse near Shanghai.

seen at the end of the house next the fence, and in this abutment was a little square niche with an ornament of flowers made in stucco. Over the doorway was a bundle of green shrubbery, evidently placed there to commemorate some event. The window, like the others, was closed with heavy wooden shutters. Besides the large window were a few small openings with close framework covered with paper.

[1] Continued from No. 1376, page 46.

Within was a large barn-like room with dirt floor and roof-rafters showing, in which were all the devices for converting raw cotton into cloth — a primitive cotton-factory. These simple and home-made devices were so interesting that I sketched them all. The cotton-gin consisted of two wooden rollers moved by a treadle which was connected with what answered to a balance-wheel in the shape of a heavy stick of wood larger at the two ends; the slender roller was

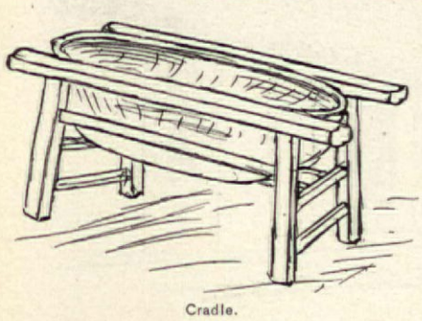


Device for cleaning Cotton.

of iron; all the other portions were of wood held together by wooden pins. The little hand-crank at one end was simply to start the machine. The device for making the raw cotton fluffy and shaking out the dirt seemed to be a very efficient machine; it consisted of a heavy wooden piece, 7 feet in length, abruptly curved at one end; a stout cord was strung to this as in a bow, a bridge at one end enabling the cord to be made tense. In appearance it reminded one of a colossal bass-viol bow. This was held from the ground by a cord which was fastened to the end of a long bamboo, rising upright from the ground, but now bent from the weight of the bow. To operate this, the person sits on the ground; before him is a pile of dirty and compacted cotton; in the left hand he holds the bow; in the right a thick knobbed stick; with this he violently twangs the cord, which vibrates rapidly in the pile of cotton in a most effective manner. The cotton by this process is quickly reduced to a fluffy condition and is now ready for the spinning-wheel, which was a primitive and rickety affair. The wheel was turned by the foot resting on the bar, the woman sitting on the bench at her work. Three spindles came out just above the wheel and three threads were spun at a time. The loom was equally rude and the old woman who was weaving when we entered the room was working with the same tireless energy that seems to characterize these people in all their vocations. The old nurse was very polite and kind and seemed greatly interested in showing and explaining everything.

The figure here given shows the baby's cradle, consisting of a thick basket held in a stout framework of wood. The mother removed the sleeping baby and placed it in what looked like an old-fashioned milk-churn, but was in reality a baby's high-chair. A floor-like partition within prevented the baby from going to the bottom. The inside of this churn-like receptacle was highly polished by the successive generations of babies who had wriggled in it.

During all my sketching in the house I was surrounded by fifteen or twenty men, women, and children who had drifted in from the neighborhood. The crowd seemed to be quite as inquisitive as a Japanese crowd under similar circumstances, but far less gentle and polite. In this house I was permited to see a woman's bedroom. The room was small and dark and it was difficult to get enough light, even with the door open, to make out clearly the various objects and details. The appointments were not unlike those in our own chambers; a dressing-table littered with the usual clutter of a disorderly bedroom; a bureau holding three drawers rested against the wall. On the top was a tall wooden candlestick, a few small jars and other objects. On the wall behind was a hanging scroll with the picture of some god or household deity done in black and white. Chairs, low stools, and a table, with no semblance of order, were about the room. In one corner was a large finely carved bedstead with heavy frame above to support the bed-curtains. The rafters of the room were exposed above. At one side was an attic or space under the roof, the floor of which formed the ceiling of an adjoining room. I noticed, as with us, the same accumulation of attic rubbish, too useful to throw away and too worthless to keep, stuff upon which more distracting brain energy has been wasted by man than in the writing of big books.



Cradle.

. . . . . .

The few temples I saw in Shanghai left the impression of neglect. They were certainly dirty, as were the priests connected with them. It was hard to trace the same cult after seeing the Japanese Buddhist temples. In one temple which I visited there was a room, more like a shop and suggesting a dime museum, opening directly off the street, in which were various effigies arranged in order on a series of step-like shelves. A few people were engaged in prayer. In the midst of these devotions a woman came in and scolded in a high, strident voice. No one interfered or apparently noticed her actions. My escort thought she was insane.

Baby Chair.

. . . . . .

As I left the city at twilight after my brief experience within its walls and glanced back through the gateway to take a last look at its narrow streets and low buildings and, recalling the mass of filth, misery and small-pox, I noticed a Jesuit priest with heavy black beard and unmistakable French face, but dressed in full Chinese costume. He was entering the city, in which he lived surrounded by all the squalor and misery. I could not help admiring his noble devotion and could readily understand why the Catholics make such progress in China in comparison with that made by the missionaries of other sects, who usually live in the foreign settlement, associated with many of the comforts of their more sinful brethren. I further realized that a convert of this priest might compare notes with a Catholic convert in Thibet or Cochin China and there would be no divergence of doctrines in the minutest particular.

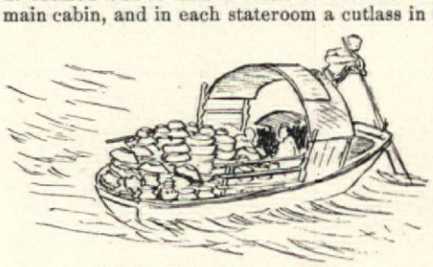
. . . . . .

After a hasty good-bye to my American friends, who had been so kind to me, I started for Hong Kong in an English steamer, having a quiet, uneventful voyage, good substantial food, exceedingly pleasant travelling-companions, and whist most of the time.

In sailing up the passage to Hong Kong an expanse of rocks loomed up which had I seen on the Norway or Maine coasts I would have insisted they showed typical glacial erosion.

From the damp, cold and shivering weather of Shanghai we had been transported in three days to a tropical climate. In the parks and gardens were palms, big ferns and a most luxuriant vegetation. The city is policed by Sepoys and on the streets one meets many races: heavily turbaned Hindoos; Parsees, with their caste-marks on their foreheads, which, curiously enough, seemed perfectly natural; Malay and Indo-Chinese, and red-coated British soldiers. The greater mass of the people were, of course, Chinese, who, alone of all the various peoples, showed the same interest and persistent activity that I had observed in Shanghai. There were slight differences in the dressing of the women's hair, but the clothing appeared the same, and the narrow streets of the Chinese quarter, though cleaner on account of English domination, sent out the same unsavory odors.

A day only in Hong Kong, and late in the afternoon I left the city on a steamer bound for Canton, a regular white, side-wheel steamer of the American type, with a Salem commander, Captain Lefavour. It seemed odd to find a stack of cutlasses and loaded guns in the main cabin, and in each stateroom a cutlass in a rack near the berth. On inquiry as to the necessity of these war-like preparations I was told that only a few years before the steamer "*Swift*" on the same route had been captured by pirates, and all the foreigners, but one, on board murdered. As pirates still abound on the river, these precautions are wisely considered necessary.



Pottery Pedler on Canton River.

It began raining at dark, and continued to rain throughout the night. The darkness was impenetrable, and it seemed incredible that any one could navigate a boat in a tortuous river under such conditions. We reached Canton the next morning at nine o'clock, the boat having anchored during the night on account of the storm.

A wonderful sight presents itself as you near the wharf. The river in places, and over large areas, fairly swarms with covered boats, literally thousands of them of all sizes and conditions, and these boats

represent the dwelling-places of families, who for generations have been born, have lived and have died without knowing any other living-place. All the trades and manufactures of a great city are represented in this agglomeration; fruit-boats, peddlers' boats of all kinds and the famous flower-boats, or, more properly, gaudy boats, a rendezvous for harlots.

The preceding figure is a sketch of a pottery peddler, who, with his stock-in-trade of pots and jars, pans and flowerpots, piled to the gunwales, plied his trade up and down the river and in and out of this maze of floating craft.

One could not help wondering at the distractions of a census-taker were he assigned to enumerate the river population. The conveniences of such a residence were immediately apparent when it was realized that one could easily sweep overboard all the dirt and dispose of all the garbage; there would be no sewage nuisance unless the river might be considered a sewer, and in either case the Chinese are apparently immuned physically — absolutely so mentally — and filth and stink give them no annoyance; no lawns to mow or sprinkle; no wells running dry or water to shut off, and when a child disappears no harrowing suspense for days, but quick realization of the calamity, if calamity it appears to these cultivated savages; no upstairs nor downstairs; no cellar to clear up nor attic to put in order.

The boat is not only a residence, but a passenger-conveyance, a baggage-wagon, a peddler's cart, a blacksmith-shop, a bakery, indeed it lends itself to every demand of life, active or idle. A glimpse into some of the boats showed them to be fairly clean and prettily fitted up in the way of pictures, bright-colored curtains and tinsel. The larger boats had lashed to their sides blocks of wood in which were square holes for the convenience of boatmen who have to ward them off or push along their own boat. As to the model of these boats, for they all seemed alike save in size, a watermelon cut lengthwise would give a very good idea of their shape. They were apparently cranky, but evidently dry. EDWARD S. MORSE.

[To be continued.]

STRUCTURAL COLOR-DECORATION OF THE INTERIOR OF PUBLIC BUILDINGS.[1] — III.

DISCUSSION.

THE CHAIRMAN said that Mr. Horsley had given them a very comprehensive sketch of a very large subject. It certainly seemed to him (the Chairman) as if English people had almost ceased to regard art as of very much public importance, or as an important means for the expression of national thought and aspiration, to say nothing of history and the idealizing of daily life. In that sense Mr. Horsley made an interesting point when he spoke of the decline of fresco-painting and the decoration of churches and public buildings, upon the incoming and popularization of literature and printing, and the multiplication of books. He (the Chairman) was strongly of opinion that the painted walls of the public halls and churches in the Middle Ages acted in a great measure as public libraries, or were a sort of equivalent for them, through presenting before the public the great facts of religious and national history, symbol and legend. He regretted that Mr. Horsley had not been able to secure specimens of the very interesting series of wall-decorations by Madox Brown at the Manchester Town-hall. Most of the illustrations which they had seen were of French origin, or showed French influence, but the designs of Madox Brown were characteristically English, and showed remarkable dramatic sense and vivid power of conception, with a certain naturalism and local truth of detail, giving one the sense that the artist had been an actual spectator of the historic scenes he depicted. He entirely agreed with Mr. Horsley in thinking that there was an immense advantage in working upon the painting *in situ* and painting in the light in which the work was to be seen: but there was also a great practical disadvantage because the work was generally built-in by scaffolding, and the artist was never really able to get away and take a fair view of it before the scaffolding was removed. Barring that disadvantage, there would, perhaps, be better results if mural decorations were painted *in situ*. It was related that Mr. Watts made an offer to the London and North-Western Railway to paint the walls of the great hall of Euston Station if the Company would be answerable for the cost of the materials, and that the offer was declined. That was, perhaps, an indication of the way in which public art was regarded. At any rate, it would appear the Company did not wish to detain people in the hall of the station, but wished to hurry them forward to take their tickets for their destination. Perhaps many of them might have missed their trains if the painting had been carried out. He was quite in accord with Mr. Horsley with regard to *tempera*. He thought that *tempera* was a medium presenting few, if any, technical difficulties, and having very great resources and advantages, including the advantage of durability. He did not think that Mr. Horsley had said very much about tile-decoration generally. Possibly that might be regarded more as an external decoration, but he had often thought that more might be done in the way of glazed or terra-cotta relief, in the method of the Della Robbia ware, as decoration. Certainly, such bold effects of color and brilliant white associated with that material were, perhaps, more suitable in the open air and in inner courts and places where reflected light was required, and, even there, associated with mural and architectural design of a particularly light-toned character. As a rule, when it was applied in this country it seemed to be in glaring contrast to the color of the materials of the building.

SIR THOMAS WARDLE said that, as a member of the Applied Art Committee, he had advocated the proposal that a paper should be read on the decoration of the interiors of public buildings, and he associated with the subject the name of his friend Mr. Horsley, of whose work he had had some experience in North Staffordshire. They there had some of Mr. Horsley's work as an architect, and it was no small pleasure to find that when Mr. Horsley suggested color-decoration for his church-architecture there, he had given them a series of paintings without which the churches in which he had worked would be bare indeed. He remembered going on several occasions to speak to him during his work at All Saints' Church in Leek, and he found him generally lying on some planks in the top of the chancel, almost invisible, but completely devoted to his work. The results of that work were very pleasing and excellent. This subject had been introduced to remove the prejudices of people. Many people in the land seemed to prefer a plain building to a decorated one. When he (Sir Thomas Wardle) advocated the subject, he did so more with regard to places of worship, as to which he had spoken in two or three papers which he had read. He had often been very much pained, on going into churches and chapels, to see the utter absence of decorative work; the worshippers in such places feeling that the buildings were better without decoration. That feeling had perhaps descended from the old Puritan times, but he believed that it was passing away. He might instance a Nonconformist chapel in Ashton-under-Lyne, where there was one of the very best windows by Sir Edward Burne-Jones and William Morris. The more that window was seen, the more it was appreciated. The same might be said of Scotland, where artistic influences are rapidly becoming general. He thought that good would be done by such a paper as Mr. Horsley had read. England was now paying much attention to art and color, and we might well rise superior to prejudice and avail ourselves of the skill which lay at our hands. In his town there was a rather amusing difficulty. Some years ago, his dear friend the late John Sedding designed a reredos for Saint Luke's Church. It was an admirable piece of work and consisted in part of sculpture. The design was a colored one, and the Puritan spirit of the town rose against the color. The people did not object to the figures or to the marble, but they objected to the figures being colored. He begged that the pictures should be painted in distemper that it might be seen how they looked; and no sooner had that been done than the whole congregation were pleased with the result. It had now become necessary to clean the reredos and repaint it, and it was to be repainted in colors as the architect designed it. Now, unfortunately, the old spirit had risen up again, and the parish was rent in twain, and some had objected to the painting being done. Papers like that which had just been read might be well directed against such weak and ignorant prejudices. They had only to look at the beautiful room in which they were assembled to see the value of decorative work. He was sure that the decorations in the Town-hall of Manchester, to which the Chairman had alluded, had had a great effect on the minds of the majority of the people in the district. At Cheadle, in North Staffordshire, there was a church built by Pugin the Elder, who decorated it from end to end. It was built about forty-five years ago, and it was one of the most beautifully decorated churches he had ever seen in his travels either in this country or on the Continent. He did not think that there was a square foot that was not decorated or painted.

MR. T. R. SPENCE said that all the materials that Mr. Horsley had advocated in his interesting paper were extremely good in their way. There was, however, the great question of design. There was a very glorious example of color-treatment in marble and tiles which Mr. Horsley did not mention. He referred to the Mosque of Omar in the temple area in Jerusalem. The whole of the outer walls of that building up to the eaves of the side-chapels were covered with a very beautiful arrangement of various colored marbles. The outer part of the wall which supported the dome was covered with most beautiful Arabesque tiles, and, of course, the effect of the marble and the tiles together in the beautiful Eastern light was beyond description. It seemed to him that in decoration in England we were too much afraid of color. His view was that the more effulgent the color was the finer was the result. He strongly advocated that the various tones of color should be rich and effulgent, and not limited to the pale grays and shabby greens which had been very much used in recent times.

MR. W. WOODWARD thanked Mr. Horsley for his very interesting and very valuable paper. He hoped that the paper would do some good in inculcating the idea that English artists were quite capable of successfully decorating English buildings. With regard to Mr. Butterfield's work at Oxford, he was sorry to differ from Mr. Horsley in his commendation of that work. He must confess that when, some quarter of a century ago, he visited Keble College, at Oxford, he thought that not only architecturally, but decoratively, Mr. Butterfield had imported into grand old Oxford something which was antagonistic to its associations. Two years ago he visited the place again, and he found that the effect of time, that grand adjunct of art, was evident in Mr. Butterfield's work. Time, as

[1] A paper by Gerald C. Horsley read before the Society of Arts, and published in the *Journal* of the Society. Continued from No. 1375, page 40.

they all knew, did an immense amount of good for all art, and particularly with regard to architecture. He had been very glad to hear Mr. Horsley speak of the mosaicwork in St. Paul's Cathedral. One had only to look first at Sir William Richmond's work and then carry one's eye to the work of Salviati in the dome to see how very much more effective was the work of Sir William Richmond than the work of Salviati. Mr. Horsley had referred to the importance of the architect and artist working together in sympathy. They would all agree in his view in regard to that point, but he was sorry to say that, in a recent work of his own in which he had expended very considerable care in detail, the decorative-artist acted upon his own initiative and produced a result which displeased him (Mr. Woodward) very much. But if the sentiment that Mr. Horsley had expressed was carried out, there could be no doubt whatever that our public buildings would be far better decorated, and far more presentable, than they were now. In speaking of mural decoration, Mr. Horsley had omitted to mention a work which appealed to every one who had seen it — Lord Leighton's lovely representation of the "Wise and Foolish Virgins," at Lyndhurst. That was, he believed, one of Leighton's earliest works. With regard to the materials, marble and mosaic, of course, had the advantage that they did not require restoration or re-doing, but he must confess, that marble and mosaic in London, unless they were kept perfectly clean, and had some attention paid to them, suffered considerably in the course of a very few months. A very fine effect was produced by simple cleanliness, and this was needed in external decorative work in London. There was another matter with regard to London decoration which Mr. Horsley had not mentioned, and that was the attempt made some years ago by Messrs. Novello in their music-establishment in Berners Street. It was an example of external decoration which looked exceedingly well, but it had suffered from the effects of the London atmosphere.

Mr. Phene Spiers said that the address was one of a most interesting kind, but it was certainly not in accordance with the title given of the subject. He had anticipated a paper on the necessity or advisability of accentuating the constructive features of buildings by color-decoration. That was a point which he hoped Mr. Horsley would take up on some future occasion, for it was of the very greatest importance. It had been brought to his mind this evening by two of the slides which had been shown of Colchester Town-hall, in which Mr. Belcher had been able to accentuate the constructional forms of the designs by the color-decoration which he had used. If an artist was brought in whose views were not in harmony with those of the architect who had not considered the buildings from the architect's point-of-view, and who failed to understand the constructional features, he would be quite liable to contradict the constructional forms by the decorations which he put in. Therefore he thought that the color-decorations of a building should be conceived from the first and that the work which the artist did eventually should be done with an understanding of the design of the architect. A totally wrong effect might be given by calling in an artist who did not understand the scheme of the architect's work. Referring to the opinions expressed as to the method of fixing mosaics, he was talking the other day with the artist who had designed the mosaics for the Albert Memorial, and who said that he was of opinion that if an artist was employed in putting the *tesseræ* down on the face of the drawing, the question of putting them up in their position and the waving of the various faces of the cubes could be easily managed, and he spoke very strongly in favor of that system of work, and alluded to an example in which superior results had been arrived at by adopting that method. He (Mr. Spiers) only mentioned that incident to show that there might possibly be two points-of-view.

Mr. C. Baskett said that as Colchester Town-hall had been alluded to, he might state that he was the person who decorated it, and he was pleased to say that the architect and he were working together in every way. When he (Mr. Baskett) took up the design, he tried to enter into the spirit of it. He considered it the duty of a decorator, when an architect was in charge, to try and enter into the spirit of his design. He had endeavored to do so with Mr. Belcher, and the result was harmony and success in work. Mr. Horsley had alluded to damp walls. Twenty-five years ago, he (Mr. Baskett) had had to decorate a church wall that was exceedingly damp. A few months after the work had been done, it had perished. In order to meet the difficulty, he had some lead rolled very thin, about three pounds to the foot, and cemented it upon the wall. The lead was painted and stippled, and it became a beautiful surface to work upon. He was at the church a few weeks ago, and the work was in as good a condition as at first, but the work which had been put on a wall close by, which was considered dry and safe, was altogether gone. It had struck him that the meeting might want to know how the difficulty was dealt with. After the lead had been applied to the wall with cement made with pitch, mixed with a little tallow, it was ironed with hot irons to ensure cohesion, and it had stood thoroughly well.

Mr. G. C. Horsley, replying, said he thought that they had had a very interesting discussion. It included points upon which naturally he was unable to touch in a paper such as that which he had read. The subject was a very large one, and opened up many avenues for consideration, and it had been impossible to touch upon more than a very few. What had been said by Mr. Spiers as to the necessity of the decorative designs of a building being in sympathy with the construction, and expressive of the construction, formed a valuable supplement to the paper. At the same time, that was a point which must depend very much upon the painter and his consultation with the architect; and he conveyed in his paper that if there was no proper sympathy between the architect and the painter, that is to say, a thorough knowledge of each other's work — in short, a knowledge of art — there could be no good decoration. It was a subject upon which all architects felt very much. He was very much obliged to Sir Thomas Wardle for what he had said about prejudice against employing artists in decorating buildings. If people had a little more confidence in artists and a little more desire to see what they could do, they would be better pleased. The prejudice against artists was a thing which they must try to overcome; the public must be educated as to that matter. Sir Thomas Wardle had spoken of the effect of the fine paintings of Madox Brown in Manchester. He (Mr. Horsley) regretted that he had been unable to obtain any photographs of them. He had nothing more to say except that he thanked the meeting very much for the way in which they had listened to his paper. He knew that it was an exceedingly inadequate production and dealt only with one or two sides of a very large and most interesting question.

Mr. J. D. Crace writes: — "Much to my regret, I was prevented by illness from attending to hear Mr. Horsley read his paper. It was a matter of great disappointment to me, on reading a proof of the paper, to find the title practically passed by in the contents. Here is an architect of great ability and high position, with a subject of intense interest and importance to architects, 'Structural Color Decoration,' actually making no reference whatever to the effect of color on structure, the one side of the subject which vitally touches the work of the architect. There are passing references to colored materials, such as marbles, mosaic, bronze, but no word as to how the placing of these affects the structural impression of the whole for good or evil. What does it matter to the structural effect whether the pictorial work on the walls is painted in 'tempera,' in 'spirit fresco,' or in 'water glass.' The architect himself, a few yards distant, could not tell which had been used. The 'vehicle' is of no consequence to the painter, of none to the architect. But 'Structural Color Decoration,' that is to say, the disposition of color as affecting the structure, does deeply concern the architect. It is this part of the subject to which I have hoped that an architect of Mr. Horsley's ability would have devoted most time and attention, for it is not only the part which most concerns architects, but, unfortunately, it is the one of which they overlook the value. I have read and listened to dozens of papers by architects on the technique of mosaic, of fresco, of encaustic painting, of marble and woodwork, 'sgraffito,' plaster, and other decorative methods and materials; not one, that I can remember, on their disposition as influencing the structural effect. Methods and 'technical tricks' are all very well, and are good for the practitioner to be familiar with; but it is the distribution of the color-masses and color-values which affects the architecture. It matters little to the effect of the building (as architecture) whether the wall-paintings represent the 'Siege of Troy' or the 'Jubilee Procession,' or whether either be painted in 'tempera' or 'true fresco'; but it matters everything whether these works are so placed as to make the columns look thin, or so colored as to disturb the perspective, or so isolated as to remain disturbing patches. It is of much more consequence to the architect that the general scheme of color should be founded on recognition of the structural lines, that the color-values should be in the right places, and that the borderings and other ornamental features should be arranged, not with a view of 'breaking up the wall-surface,' but with careful consideration of their effect in expressing or explaining the surface, and in assisting the perception of structure. So far as it does, this color glorifies a building; where it does not do this, it abases it as architecture. A wall-painting may be full of admirable skill and yet be absolutely detrimental to the architecture which encloses it. Until architects will recognize this very plain fact, and will devote more attention to the influence of color on structural effect, leaving aside the technical questions which, after all, more concern the executive artist, we shall obtain no real alliance of the Arts. Let the architect get to know how color will affect his work, where it should be used, and why, and he will find the painter much more ready to listen to him than when discoursing of how to put it on."

THE EXHIBITION OF THE BOSTON ARCHITECTURAL CLUB.

THE impression produced on the visitor to this year's Exhibition of the Boston Architectural Club, at the gallery of the Boston Art Club, is quite as pleasurable as that which was awakened by the very notable one held three years ago in the gallery of the St. Botolph Club, and yet there is a very distinct dissimilarity between the evident aims of the committees in charge and a consequent unlikeness between the fruition of their efforts. Three years ago three ends were had in view and each goal was honorably achieved. First, it was sought to make the exhibition one that should appeal to the public even more than to the professional appreciation, and so architectural drawings, pure and simple, were ruled against with some strictness; next, a point was made of exhibiting positive rather than

possible architectural accomplishment, and so photographs of executed work were sought rather than perspective-drawings made before the buildings themselves had been built into shape, and, finally, some attempt was made to show what was being accomplished in the field of architectural-landscape design, which just then was beginning to excite a real popular interest. The result was an exhibition that appealed to the lay mind and filled the gallery with unprofessional visitors as we have never seen a gallery filled at any other architectural exhibition.

That was three years ago, and since then there has been no general exhibition in Boston, though there have been special exhibitions of individual work at the rooms of the Architectural Club itself, or in the gallery of some picture-shop. Consequently, people turn with some zest to inspect what the walls reveal, without that jaded feeling of being pretty sure that four-fifths of the work will be at least first cousins to four-fifths of the work shown a year before. After the lapse of three years, the chances are that the accomplished draughtsmen whose work won applause at the previous exhibition may have become busy with the practical side of work in their own offices and, so, finding no time to exercise their own skill, have had to make way for a younger group of draughtsmen, whose names are unknown and whose methods may be fresh and individual. A periodicity of three years has some very strong points to commend it.

The general impression of this year's exhibit is that it is one which possesses dignity and interest in a very unusual degree. The majority of the exhibits have, beneath the dress with which they have been endued for exhibition purposes — whether to please the taste of the public or to satisfy that of a prospective or an actual client — a framework of real architectural worth, and it is the perception that this architectural worth is there and will exist in the executed buildings, that it is not a mere matter of pen, brush and paper, clever draughtsmanship and knowing tricks, that causes one to feel that here is abundant evidence of real advance in architecture and that the various schools of architecture have not been founded and supported in vain. The trivial, the commonplace and the purely vernacular have either not been offered to the judges or else they had the courage to reject them. There is hardly a number which has not enough of real interest in it to justify the committee in giving it wall-space.

While the Exhibition is dignified and is fairly representative of work of a good type and the performance of men of ability, it is, distinctly, merely a miscellaneous gathering and as such typifies the average annual practice of the average architect, who has to stand ready to turn his thoughts and his pencil from a tenement-house to a church, from a cottage to a school-house, from a factory to a town-hall, possibly, if his practice is good, being compelled to perform these feats of architectural gymnastics all in the same day or, at any rate, within the limits of a few weeks or months. It seemed to us, as we found ourselves forced to change our point of appreciative observation as we passed from wondering over the housekeeping expense of keeping up a millionaire's "cottage" to admiring the quiet color-scheme of a church interior, and then on to an approving glance at some ingenious wrought-iron work, that it might be a very agreeable and desirable thing to hold, some time, an exhibition devoted to a single class of buildings — to churches, for example, or, at least, to group together buildings of the same class accepted for one of the ordinary miscellaneous exhibitions. At this exhibition there are shown half a dozen or so designs for churches which one would like to study side by side, instead of having to wander backwards and forwards from one side of the gallery to another. And speaking of churches, it has been a very noticeable fact that there are seemingly eras of activity in church-building, when every office, seemingly, has a set of church-drawings on the boards, and when this happens, the ecclesiastical flavor of an architectural exhibition is very pronounced indeed. This season appears to be an off-season in church-building, for, aside from Mr. Henry Vaughan's photograph of the rather barren and uninteresting stone church at Northeast Harbor, Me., church exteriors are confined to pencil-renderings of Mr. C. B. Dunham's Baptist Church at Arlington, and an unnamed study by Messrs. Clark & Russell.

Church interiors, on the other hand, are fairly numerous, from Mr. H. B. Pennell's large and elaborated water-colors of St. Peter's and S. Francesco at Assisi — drawings in which he has successfully curbed his penchant for violent blues and unnatural greens — to Messrs. Arnold & Locke's presentation of a most charming color-scheme for the decoration of St. Brigid's, in Jersey City, a drawing which is rather killed by its immediate neighbors.

It is in color-work that this exhibition is peculiarly strong and interesting, a full half of the numbers being treated in color to a greater or less degree. The one strong impression brought away from our first view was that created by Mr. W. R. Emerson's wonderful little drawings in colored chalks — common carpenters' chalks, he always takes pains to inform you, not the colored crayons to be found in the shops of the purveyors of artists' materials. Rarely has so glowing and rich a bit of color been produced as his little "Church Interior": it haunted us all night and at the next visit we went straight to look at it again, this time at shorter range, and so discovered that some part of the delightful harmony of effect and some reënforcement and blending of the tones had been secured by a trick — a trick with a purpose and, so, wholly justifiable. This and his other chalk drawings were framed and glazed, of course, but in place of using ordinary picture-glass he had chosen pieces of clear cathedral-glass of a strong saffron-colored tone and so had gained for his yellows, browns and reds a warmth and strength, as well as a depth and transparency, that could not have been obtained otherwise. It is a new idea, we believe, and seems to be one that might be adopted by some performers who are a bit color-blind. For instance, we can imagine that the violent and unnatural greens which are so much affected by Mr. H. B. Pennell and Mr. George F. Newton might give more pleasure to other people if they should be seen through a glazing of, say, a light bottle-green, and the chill that hangs about Mr. G. H. Hallowell's uncanny and geological sketch of "Dalmatian Houses" might produce shorter shudders if seen through a claret or madder colored glass. This drawing of Mr. Hallowell's and Mr. Emerson's "Church Interior" are about as far apart in method and result as they well could be, and yet both are most admirable and satisfactory drawings. The mannerism — whether original or merely imitative — shown in the "Dalmatian Houses" Mr. Hallowell abandons in his charming sketch of "Chartres" hung just above.

In the same corner is Mr. George P. Fernald's large water-color of the "Sala del Senato" in the Ducal Palace at Venice, an unusually successful piece of work; rich and warm in color and having about it no taint of scene-painting, it presents all the substantiality of a real room built of real materials. Admirable as is this drawing, Mr. Fernald greatly surpasses it in his drawing of the "Cloister at Taormina, Sicily," which we look on as a rather remarkable performance for an architectural draughtsman: it has the character of the work of a skilful painter who by some fluke had succeeded in painting an architectural subject so that the character of the architecture had neither been lost nor absolutely vilified.

The character of the water-color work hung seems distinctly to show that the present generation of architectural draughtsmen are abandoning some of the conventions of architectural drawing and, in their place, adopting, with modifications, some of the methods of the painters and decorators. The result is that the colored drawings at this exhibition have a greater meaning and interest for the occasional lay visitor than architectural water-colors used to have. What we mean can be noted by one who should take the trouble to pass from Mr. Fernald's drawings to a couple of drawings by the late Arthur Rotch, which for some unexplained reason are hung with the work of his successors, and Mr. Rotch's drawings were, in their time, held to have an unusual degree of pictorial merit.

But all these drawings we have referred to are based on subjects, mainly foreign, that appeal to the pictorial instinct of painter and architect alike. There is a difference between the invitation that is extended to an artist by the created result, time-worn and weather-stained, and that which is offered to him by the dry lines of an architect's orthographic drawings which he has got to humanize and vivify. In this kind of work Mr. Langerfeldt used to be, in Boston, the head of his class, and no exhibition was complete that was not adorned with half a dozen or so of his renderings. Ill-health and advancing years have seemingly put an end to his vogue, for none of his work is here, and there are only a few of the elaborate drawings made by Hughson Hawley, who for the New York offices renders the same sort of service that Langerfeldt used to render in Boston. It shows how the spirit of the times has changed that one turns from these drawings rendered in body-color, with over-emphasized highlights, to imbibe greater pleasure from observing how the younger men are arriving at effects by a simpler method. One of the most "knowing" of these methods is employed by Mr. Gregg in the production of a very charming sketch of the equally charming design made by Mr. J. T. Kelley for the "James Russell Lowell Memorial Gates" in Cambridge. Mr. Gregg seems to have produced his effect by using colored crayon on the back of tracing-paper on which the drawing was made, and then mounting on cardboard. If soluble colors in powder should be applied in the same way the blending of the colors would be still softer and less observable. There are so many specimens of Mr. Gregg's renderings hung in one part of the gallery or another that one is at first tempted to believe that the exhibition is his own private affair. But marked as his mannerism is, he successfully avoids monotony, and by using different media and fitting his treatment to the character of the material used in the building itself he succeeds in holding the interest of the observer, an interest which is about equally divided between the merits of the drawing and the merits of the design. There are so many draughtsmen nowadays who devote their time to rendering drawings for other people that it is not very often that an architect exhibits his own sketches, so that it is particularly pleasing that so excellent a type of this sort of color-work should be shown as that to which Mr. Guy Lowell treats us in his drawings for houses at Philadelphia and Beverly, Mass. The group of Mr. Wilson Eyre's freakish drawings has less of the air of unreality about them than is usually the case. It is a dangerous gift, this aptitude for turning out picturesque and "catchy" sketches, which attract by their unreality and charm by their unusualness. Mr. Emerson has the same gift, and we have heard it whispered that more than one client of his had wondered why his completed house looked not so very different from his neighbor's and so little like the original sketch that had captivated his fancy.

One other water-color drawing deserves to be mentioned, and that the "Night View of the *Examiner* Building," San Francisco, designed by the late A. C. Schweinfurth.

Architecturally, too, the exhibition is interesting. Lord, Hewlett & Hull's competitive drawings for the new Department of Agriculture Building, at Washington, have far more of merit in them than we were disposed to believe after seeing illustrations of their design in

the newspapers — and yet illustration in the daily paper is more and more sought after by architects! Nearby are the drawings of Babb, Cook & Willard for a house on Fifth Avenue, New York, sedate and carefully studied, but because of the slight rendering given to the drawings, not attracting the attention they deserve. At the other end of the gallery is Hawley's good rendering of Mr. G. B. Post's "New York Stock Exchange," a design which recalls the jibes that New York critics have cast on Boston because the architects of the Tremont Temple chose to crown their façade with the front of a Greek temple. Here Mr. Post has adopted a variant of the same idea and planted his great temple portico — octostyle *in antis* — slap across the middle of his building, without any particular association with the stories above it or below it. The portion of the wall of the building which runs up beside the portico, pierced as it is at each story with windows of the proper size for business-office usefulness, recalls the tale of the farmer who cut a hole in his barn-door for the cat and a smaller one for her kittens.

Near this are detail-drawings from the office of McKim, Mead & White and the Supervising Architect, the only things of the kind hung. Half way down the gallery and facing one another hang Ernest Flagg's drawings for the Naval and Military Arch — the, to us, most unpleasing design that the exhibition contains. Mr. Flagg has been "strenuous" to the last degree and his up-circling cornice, an abomination of abominations, seems to ape the pinned-up flap of a Rough-rider's slouch-hat, but seen only in elevation. The character in the hat comes out when the side or perspective view is had and the particular angle at which it is cocked determines whether it is becoming or unbecoming to the wearer. It seems to us that Mr. Flagg cannot have studied his design in perspective, else the weakness and disgraciousness of this particular form of crowning-member could hardly have escaped him. This weakness is not helped by the engaged, or rather embedded, columns with their pitiful fragmentary caps with which he has chosen to embellish the angles of his structure. The effort for originality has been strenuous enough, but something more than effort is needed to compel success.

The greater part of the remaining drawings come from Boston offices and most notable amongst these is the group of drawings which exhibit Cram, Goodhue & Ferguson's very interesting scheme for the "Sweet Brier Institute," in Virginia. One can only hope that the young ladies may eventually find themselves actually housed in real buildings that do not do injustice to the charm which Mr. Goodhue's marvellous drawings assure us they are intended to have. A large part of the work that comes from this office is Gothic in feeling, for Mr. Cram is amongst the most devoted upholders of the tenets of the Gothic school, but besides this he has a real love for Colonial work, and intended that this group should have all the charm and refinement of the best work in that most adaptable style. It seems to us, however, that he has been led a little astray by the importance of the group of buildings he was designing, and the consequence is that he has verged rather on Roman grandeur and has somewhat overpassed Colonial simplicity. Some of the buildings taken by themselves are satisfactorily Colonial, but the group, as a whole, has a too Roman air, just as the University of Virginia buildings are losing their original Colonial feeling and putting on a Roman aspect with the accretion of more and larger buildings.

It takes more than an esoteric appreciation of the good qualities of Colonial work to enable one to design successfully in that style. Mr. Cram has not quite succeeded here, and Mr. Ogden Codman, Jr., who is a pronounced devotee of the style and knows far more about it than most people, has not made an entire success with the two or three houses in the Colonial style which he exhibits: he fails when it comes to the roof, or rather the upper stories and the roofs combined. Here he has followed the type as it exists in the Georgian architecture of England, rather than that which is exhibited by the more generous and agreeable treatment presented by the best examples of Colonial work in this country. Of the several designers who exhibit buildings in the Colonial style, Mr. Guy Lowell, it seems to us, comes nearer the mark than any one. In no one particular is there a greater failing than in the handling of the gambrel-roof: several such are shown, and in every case, while the angles of the roof-slopes are in themselves sufficiently agreeable, yet in each case the building, as a whole, is "high-shouldered," — and a gambrel-roofed building cannot afford to be high-shouldered. The worst offenders in this particular are the various farm-buildings which Messrs. Coolidge & Carlson have designed for Mr. T. W. Lawson's stock-farm "Dreamwold," a name which is rather set at naught by the barrenness of the surroundings of the buildings and the general aridity of the buildings themselves. This is all the more unfortunate since in intention, and in many particulars of detail, the designers have shown a great deal of ingenuity and an originality that is fruitful in interesting isolated results. In later years, when plantations have grown and shingles have warped and grown gray, doubtless the name and the architect's intentions will be found more in keeping. These buildings are shown only in photographs, and form part of the the collection of photographs which have been grouped in a room by themselves, where they successfully kill one another. Almost all the photographs have one kind or another of platinum finish, and while a portrait platinotype is an admirable thing, one can stand about one in ten prints finished in that style in an architectural collection. These heavy smudges of shadow, shadow without gradation, too, exasperatingly obscure detail one would like to see.

There is very little in the way of miscellanies shown. Some interesting wrought-iron sign-boards for "Dreamwold," by Coolidge & Carlson, some andirons and knockers, by Mr. Russell G. Cook, and an inlaid oak and silver panel, by Mr. Oliver Ainsly, are amongst the most interesting in this class artistically, while the models for a narrow library-frieze by the same designer are amongst the amusing and ludicrous efforts of genius. A real effort has been made to collect plaster models, and we have the large models by Mr. Hugh Cairns of a pediment group for the Massachusetts State-house, and sundry bits of ecclesiastical sculpture for St. Vincent's, South Boston. Besides these is shown the model of Messrs. Peabody & Stearns's great country-house "Penshurst," for Percival Roberts, Esq., at Narbeth, Pa., which lends interest to the quarter-scale drawings of two elevations that are hung on the wall above, and the model of the fountains at the entrance to the Fenway designed by Mr. Guy Lowell. Judging by the amount of attention these models seemed to attract, visitors do not care much for this form of exhibit but derive a better idea of the designer's intention from the drawings.

Amongst the buildings which lend dignity to the Exhibition are the "Board of Trade Building" on State Street, by Messrs. Winslow & Bigelow, which promises to be unusually satisfactory, and the very rational scheme for the "Faulkner Hospital," by Messrs. Kendall, Taylor & Stevens.

For one fact we are profoundly grateful: if there happened to be any drawings representing the work of any converts to the erratic teachings of the believers in "l'art nouveau" they wholly escaped our notice.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES COURT-HOUSE AND POST-OFFICE, INDIANAPOLIS, IND. MESSRS. RANKIN & KELLOGG, ARCHITECTS, PHILADELPHIA, PA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

THE entire contracts for this building have recently been awarded.

FRONT AND REAR ELEVATIONS OF THE SAME BUILDING.

DETAIL OF ENTRANCE PAVILION OF THE SAME BUILDING.

DETAIL OF MAIN COLONNADE OF THE SAME BUILDING.

[The following named illustration may be found by reference to our advertising pages.]

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: — THE TEMPLE OF MUSIC, FROM THE COURT OF LILIES. MESSRS. ESENWEIN & JOHNSON, ARCHITECTS; — THE ETHNOLOGY BUILDING. MR. GEORGE CARY, ARCHITECT.

NOTES AND CLIPPINGS

CHINESE COFFINS AND LUMBER. — In China probably more wood is used for coffins than for any other purpose. The coffins are made of lumber from 4 to 10 inches thick. It is not a high estimate to say that from 8,000,000,000 to 10,000,000,000 feet of lumber are annually thus utilized. — *N. Y. Evening Post.*

STEPS AT DOORWAYS. — The case of Davies *vs.* Tree, which resulted in a verdict for £150 damages against the proprietor of Her Majesty's Theatre in consequence of injuries sustained by a visitor to the theatre, should be instructive to architects who are ill-judged enough to plant a door on the top of a 6-inch step, so that the fact of the existence of a step is only visible from one side of the door (and may be overlooked even then) The plaintiff's case was not one of the best in the world: he was apparently in an excited state and in a great hurry to inquire as to some presumed mistake about his seats, and he went very quickly through a door which he said was pointed out to him by an attendant, but which in the evidence it was shown was not intended for the public, but only for the staff. In spite of this, however, the jury awarded him very substantial damages for the injuries which he received from a fall caused by the unexpected step in the doorway; and we think they were right. Of course one must sympathize with Mr. Tree, who has had to pay for the mistake of his architect; but perhaps the verdict will serve to impress upon some architects that it is a mistake, and a very stupid one, to place a step just under the closing line of a door, and that their clients may have to pay for it, and will not love them therefor. — *The Builder.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, MAY 24, 1902 No. 1378

CONTENTS.

SUMMARY: —
Costly ready-made Dwellings in New York. — The Circumscribed Space available for Dwellings of the Wealthy in New York. — Enlargement of the Maryland State-house. — Fireproof Wood and the New York Building-law. — Competition for the Emblem for the Louisiana Purchase Exposition. — Projected large Railway Station for Leipsic. — The Düsseldorf Ship-building Congress. — The New Rotch Travelling-scholar. — More Facts about the Trans-Siberian Railway. — The highest Fall of Water in Europe. 57
DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES. — VIII. 59
THE INIQUITY OF THE ENGLISH LAW OF ANCIENT LIGHTS. . . . 60
JOURNAL SKETCHES IN CHINA. — IV: CANTON. 61
ILLUSTRATIONS: —
Bramhall Hall, Alderly Edge, England [1521]; — Wollaton House. — Worsley Old Hall, Manchester, Eng. [1580]; — Hardwick Hall. — St. Catherine's near Bath, England; — South Side of Courtyard, Kirby Hall. — Brereton Hall, near Congleton, Cheshire, Eng.; — The Quad: Bramhall Hall, Cheshire, Eng. — Divers Details in Pyrénées Orientales, France. — Pan-American Exposition, Buffalo, N. Y.: — "The Football-player"; — "Michael Angelo."
Pan-American Exposition, Buffalo, N. Y.: — Vase; — Diana Trivia. 64
NOTES AND CLIPPINGS. 64

THE New York *Evening Post* says that a house on Fifth Avenue, thirty-five feet wide, in process of erection as a speculation by a well-known firm of builders, was recently sold, when barely roofed-in, and, of course, without partitions, plastering, decorations or fittings of any kind, for five hundred thousand dollars; and it moralizes on this circumstance, to the effect that the modern millionaire dislikes the trouble of selecting a lot, having plans made for him, and going through the vexations, and, perhaps, delays, of building-contracts, and is coming to prefer a simple inspection of the assortment of ready-made houses offered by speculating builders of good reputation, from which he can make a choice according to his purse and his tastes; and says that, to meet this demand, the firms which make a business of building houses for sale have increased the magnitude of their operations, producing and offering dwellings ranging in value from two hundred thousand to five hundred thousand dollars, where, fifteen years ago, their maximum investment in a single house was usually not more than a hundred and fifty thousand dollars, and most of their buildings sold at forty to sixty thousand.

PRICES, however, have risen in New York within a decade or two, and it is fortunate for the building-firms that the number of very wealthy purchasers has increased also. Twenty years ago, sixty-five dollars a square foot was considered a high price for a corner-lot in the best residential section of Fifth Avenue. Now, one hundred dollars a square foot is the average price paid for lots in the middle of a block in that portion of Fifth Avenue which fronts Central Park, between Fifty-ninth Street and the Lenox Library. If we are not mistaken, this is by far the highest price for residential land in any city in the world. In London, there are so many places where fashionable people can live with credit, from the gloomy but aristocratic streets and squares of Mayfair to the pleasant regions around the parks, that land is not extravagantly costly in any of them; and, in Paris, there are so many beautiful streets within a radius of a mile or so from the Arc de Triomphe, all, practically, equally fashionable, that prices of lots do not average more than fifteen to twenty dollars a square foot. In New York, on the other hand, the area of desirable land for dwellings is small. The ever-present foreign element has long ago taken possession of the shore of the East River, and of the region immediately adjacent to it, and the border of the Hudson, up to the beginning of the Riverside Drive, is also mainly occupied by foreigners. Those who are rich enough to live where they like, and wish to be secure against disagreeable neighbors, are obliged, therefore, to take refuge in a comparatively small territory, of which the Central Park occupies the middle. Naturally, the land fronting on the Park itself is the most desirable, and, of the two avenues bordering the Park, Fifth Avenue, although less attractive in many ways than Eighth Avenue, on the other side of the Park, has the advantage of more established fashion. It is here, therefore, that the palaces of the Vanderbilts, and Astors, and Huntingtons, and Carnegies and others have been built, and, for many years to come, this will be the region to secure a foothold in which the millionaires from all over the country will pay almost any price.

MASSACHUSETTS and Maryland are the only States, out of the thirteen which originally formed the Union, which have preserved their original State-houses nearly unaltered. Massachusetts, rather than pull down or enlarge the building of which it is so proud, has spent six million dollars in providing an extension which is far larger than the original structure, but is so arranged as to change the effect of the latter as little as possible. Following this good example, the Legislature of Maryland has adopted a plan for adding to the State-house at Annapolis, which is far too small to accommodate the State business, an extension, about twice as large as the original building, but arranged to harmonize with it, and to change its character as little as possible. Annapolis is famous for its beautiful Colonial buildings, and it is a satisfaction to think that the architectural traditions of the place, as well as the historical associations of the State Capitol, are to be respected.

THE New York Superintendent of Buildings has stopped work on the new hotel for the Astor Estate, on the ground that wood was being used in finishing which, while intended to be fireproof, as the law of New York requires in all buildings more than one hundred and fifty feet high, is not satisfactorily so. While all architects will uphold Mr. Stewart in enforcing the law, a good many of them would like to know by what treatment wood can be made fireproof to his approval. The whole subject of fireproof wood is in a condition of deplorable uncertainty. Architects are showered with circulars and descriptions of "absolutely perfect" processes for making wood fireproof, alternating with "official reports," furnished by rival concerns, showing that these "absolutely perfect" processes do not fireproof the wood at all, but merely impart to it objectionable qualities. The tests made by the United States naval officers upon fireproof wood for use in ships of war have had, as they deserved, much weight with architects, but doubts have been cast upon the efficacy, or, at least, the permanency, of the results of the processes once favorably regarded. In this state of uncertainty, architects will be grateful to Mr. Stewart for an exact definition of what he considers an efficient process for fireproofing timber, and we do not doubt that the managers of the Astor Estate will be grateful also.

THE management of the St. Louis Exposition of 1904 announces a competition for a design, emblematic of the purchase of Louisiana by the United States from France, which can be used for a seal, medal, letter-head, poster or other purpose in connection with the Exposition. The designs may be in relief, or in black-and-white, or color, according to the preference of the artist, and must be delivered to Messrs. W. S. Budworth & Son, 424 West Fifty-second Street, New York, between Saturday, November 1, and Wednesday, November 5, 1902. They will be judged by a jury consisting of Messrs. Frederick Dielman, President of the National Academy of Design; John La Farge, President of the Society of American Artists; J. Q. A. Ward, President of the National Sculpture Society; Lorado Taft, President of the Society of Western Artists; C. F. McKim, President of the American Institute of Architects; Wilson Eyre, President of the Philadelphia Chapter of the Institute, and Professor Alcée Portier, President of the Louisiana Historical Society; and a prize of two thousand dollars will be awarded to the design placed first, which is to become the property of the Exposition management. Designs in relief must be, if circular, twenty inches in diameter, and if not circular the greatest dimension must be twenty inches. If artists prefer to submit a design for a poster, the drawing must be twenty-four by thirty-six inches, with a margin, increasing the full size to twenty-eight by forty-two inches. The style of lettering, if any, should be shown, and a design intended to be used for one side of a medal should show

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

also the other side. No designs will be received by the Exposition authorities in St. Louis, but competitors, who are to send their designs to New York only under motto or device, are required to send to Mr. Walter B. Stevens, Secretary, Louisiana Purchase Exposition, St. Louis, a letter, marked on the envelope "Emblem Competition," advising him of the submission of a design, and enclosing in a sealed envelope, a card, with the artist's name and address, and the device or motto with which the design is signed. A portion of the designs will be publicly exhibited, and these will be returned at the expense of the Exposition authorities, unless acquired for the Exposition. Those not exhibited will be returned at the expense of the owners.

ACCORDING to the newspapers, the fever for huge railway stations is at its height in Germany just now. The municipality of Leipsic, in connection with the Government railway administration, has entered into contracts for the construction of a station at Leipsic which will cost twenty-four million dollars; and enormous stations are said to be projected in other German cities. It is not likely that officials so enlightened and careful as those of the German railway administration would take such a step rashly, but experience in this country indicates that mere vastness in railway stations is anything but a desirable quality. The South Terminal in Boston, the largest railway station in the world, while it has, probably, no more track-room than is required for the various roads entering it, includes a large amount of other accommodation for which there is no need. The so-called "Midway," for example, which serves simply as a promenade, is far too vast. Even with its capacity practically diminished by one-half by the newspaper stands, soda-water bars, cigar-booths and miscellaneous structures scattered over it, most of the remaining space in it might have been transferred to the sidewalk outside, with advantage to the comfort of the public, as well as to the pockets of the stockholders. In the same way, the long and imposing range of ticket-offices is simply an expensive obstruction, only two windows, out of a row of something like a dozen, being used, even during the busiest hours of the day; and the vast waiting-room, also encumbered with flower and candy stands, would accommodate ten times as many people as are ever seen in it. Apart from the cost of enclosing and covering these useless spaces, they serve simply to fatigue and perplex travellers, and to provide a comfortable harbor and place of business for swarms of tramps, thieves and swindlers, who prey upon those who are entitled to the use of the station.

WE are so accustomed, in this country, to thinking that only "big men," such as "coal barons," "lumber barons," "iron barons," "beef barons," and "kings of finance," are capable of undertaking anything in the way of industry or commerce, that the idea of a Congress of ordinary mortals, to study the methods by which people who are not millionaires can own ships, and sail them profitably, seems almost dangerously disrespectful to the monarchs of the Trusts; yet such a Congress is to be held at Düsseldorf this year, beginning June 29, and continuing until July 5, the members of the Congress joining, after the sessions are over, in an excursion to the Kiel Canal and the cities of the Hanseatic League. The Congress is divided into two sections, one for ocean navigation, and the other for internal navigation, and in each branch technical and economic questions relating to it will be discussed. Among these questions are the deterioration of coal and coke by shipment; the dredging of harbors, and their flushing by tides or otherwise; the arrangement of docks; the employment of lighters; signalling in fogs; and, in the section of inland navigation, the mechanical propulsion of vessels on canals; the utilization of waste power at weirs, and the surmounting of great ascents. As usual in German Congresses, the proceedings are relieved by several incidental excursions, for which the situation of Düsseldorf is particularly favorable. For the afternoon of Tuesday, July 1, excursions are arranged either to Duisburg or Elberfeld; on the following Thursday there is to be an excursion up the Rhine to Cologne and the Seven Mountains; on Saturday members can choose between visits to the Krupp works at Essen, to the great dam at Remscheid, and to the Dortmund-Ems Canal. Saturday evening the three-day excursion to Kiel begins with the night journey to Bremen. Persons interested in the subjects discussed, although not members, may be admitted to the sessions of the Congress, under certain conditions, under the guidance of a member.

THE Rotch Travelling-Scholarship in Architecture has been awarded this year to Mr. J. F. Clapp, of Boston, and the second prize, given by the Boston Society of Architects, to Mr. Benno Janssen. Mr. Clapp is a graduate of the Architectural Department of the Massachusetts Institute of Technology and will go abroad well prepared for the work which he is to do.

THE *Russisch-Deutsche Bote*, a weekly journal, published in Berlin, with articles in Russian and German, gives an interesting account of the Trans-Siberian Railroad, on which continuous tracks are now laid from Moscow to Port Arthur and Vladivostock. It will be remembered that, for several years past, the line has been interrupted at Lake Baikal, across which passengers and freight were transported by steam ferry-boats. During the summer this transportation was easy and agreeable, and an attempt was made to continue it through the winter, by keeping the path of the ferry-boats clear with an enormous ice-breaker, the most powerful steamboat in the world, which could make its way through ice five feet thick; but this experiment did not prove very successful, and it was found advisable to continue the railway around the lake. This work has now been accomplished, and some difficult mountain engineering is so far complete that provisional tracks can be laid, although it will be two years before the permanent construction is finished. Meanwhile, however, the road is building up a large business, and developing the country through which it passes with great rapidity. Three years ago, the town of Novo-Nikolaievsk, near the crossing of the Obi River, had three thousand inhabitants. It has now sixteen thousand; while the village of Sretensk, not far off, has increased in the same period from seventeen hundred to eight thousand inhabitants, and new villages, which will soon be towns, are springing up around the stations. Coal-mines have been opened at three widely-separated points on or near the line; rich copper and gold mines are in process of development; agriculture is flourishing, and, next year, two beet-sugar factories are to be erected, besides flour-mills and oil-refineries. The total cost of the road, thus far, has been about four hundred million dollars, and the completion of the permanent way will add considerably to this sum. It is not surprising that the receipts from traffic do not yet pay the operating expenses of the line, much less interest on the cost; but the Russian Government looks at the development of the country, rather than immediate profit, and a line of this kind, connecting, practically, all Europe with all Eastern Asia, which has nothing to fear from competition, is sure to bring in a revenue sooner or later. When the permanent way is finished, passengers can be carried from London to Hong-Kong in about one-third the time that is now required for the trip by way of Brindisi and the Suez Canal, and at a much smaller expense; and the most inveterate British prejudice cannot prevent passenger-travel from taking that course. Whether freight will also be diverted from the water route remains to be seen, but it is probable that the steamers will continue to carry at least the bulky goods. So far as this country is concerned, the building-up of a great civilized community on the other side of the Pacific is a matter of the utmost importance. It has always been a question whether our trade in coarse cottons with China, in competition with England, was worth making great sacrifices for, but the trade which would naturally follow the development of Siberia, and which would include, probably, the exchange of copper, coal, wool, furs and oil for machinery, fine silk, woollen and cotton goods, canned fruits and provisions, and the other products of our varied industries which would be absorbed by a prosperous and civilized community, must ultimately be enormous.

THE lovers of nature will, we fear, experience another shock at learning that the highest waterfall in Europe, if not in the world, has just been made artificially, by digging a ditch from a mountain lake to the edge of a precipice, for the purpose of lighting a village, and driving the machinery of a factory. This cascade is situated at Vouvry, in Switzerland, in the Valais, on the edge of the lofty range of mountains which includes the Great Saint Bernard, Monte Rosa and the Matterhorn, and is more than three thousand feet high. It is, however, invisible to tourists, being enclosed in iron pipes, and manifesting itself only at the lower end, where it flows away through a set of turbines, which drive the ordinary dynamos used for converting energy for transmission to a distance.

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES.[1]—VIII.

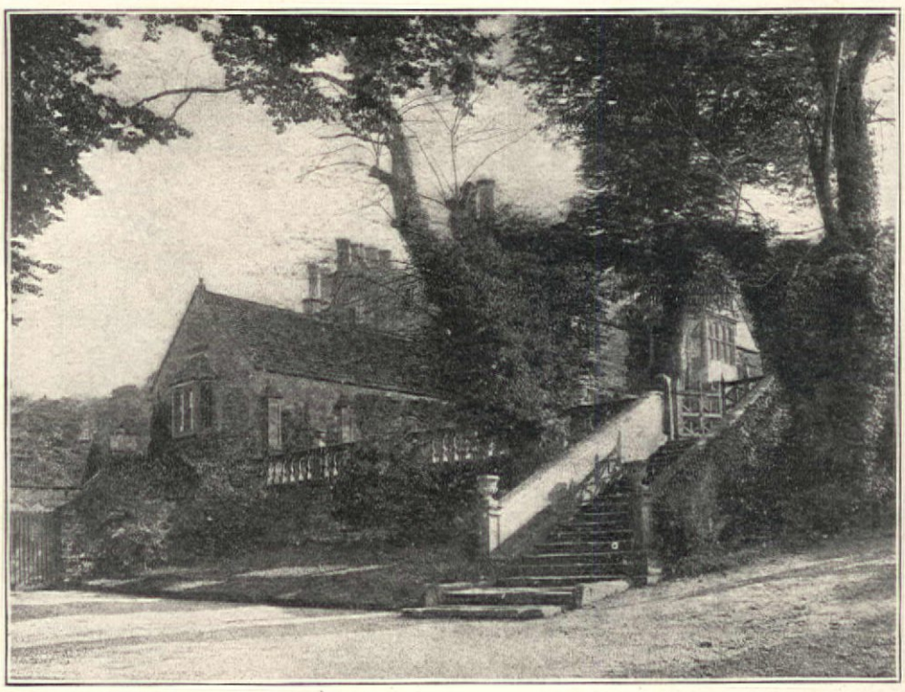
THE architectural features of the "Tudor" style are very distinct, essentially "Perpendicular" in character, but further developed, modified and enriched with added decorations.

In the earlier period we find turrets, octagonal in plan, highly ornamented, finished with ogee-shaped domes, the angle-ridges covered with crockets, surmounted with coronets as finials, or lions rampant supporting bannerets as vanes. Also expansive bay-windows extending from base to parapet, as may be seen at Henry VII's Chapel, the Augustine monasteries at Canterbury and Ipswich, at Oxford, Cambridge, Exeter, Haddon, Kirby Hall, etc. These are replaced later by the oriel-window, not less beautiful in detail, but much reduced in size and limited to one story.

Pinnacles are introduced in the gables, the roofs increase in height and pitch, as may be seen at Hampton Court, but in the time of Elizabeth we find the turrets disappearing altogether, the gables become moulded and diversified in outline, retaining the pinnacles; moulded and carved brick and terra-cotta become prominent substitutes for stone, in which we may see further Italian influence.

Permanent *fireplaces* having come into general use, we find a wonderful development in the prominence given to *chimneys;* they were built of brick cut, stamped and moulded in fanciful forms, many of extreme beauty, twisted reeds, zigzag and lozenge work, decorated with the fleur-de-lis, rose, crown and other ornaments in great variety of design.

Brick-making had greatly improved and brick with stone dressings formed the usual mode of building in the more important houses, and later we find the window-mullions, the strings and cornices executed in moulded brick. In the more ambitious works, like Hampton Court, we find beautifully carved heads of the Kings and the leaders of the times in circular panels executed in terra-cotta in the most perfect manner.



St. Catherine's, near Bath, Eng.

We also find the introduction of black or discolored brick in diaper patterns. These fire-stained bricks had, no doubt, been previously used in the hearting of the walls, but, as another evidence of the tactfulness and originality of the architects of the time, we find them converting apparently blemished materials into an effective means of decoration, many very striking examples of which exist at Hampton Court, in Bermondsey, and in the county of Kent, generally. These are in various forms of lozenges, diamonds, cross-keys, intersecting triangles, globe and cross, arcades, balustrades, dates, etc. The effect is most marked and picturesque, and shows the same tendency to enrichment by surface-decoration that, in more pretentious buildings, is secured by panelling.

The prevailing use of the four-centred, or "Tudor," arch is another salient feature, as distinct in fact as the two-centred Gothic arch itself, becoming more and more depressed as the period advanced. Not infrequently semi-elliptical or three-centred arches are met with, till, finally, in the later buildings of the Elizabethan age the arched form in the lights of windows was replaced by the horizontal head and transom, the lintel of pre-mediæval times supplanting the arch. These many-storied windows were filled with rich stained-glass in leaded lights of more or less intricate design, emblazoned with the crests and armorial bearings of the founders or owners. This is called heraldic glazing, the idealization of adjuncts deemed necessary in preceding ages; the stern emblems of the wars in which their forefathers had won renown and broad domain were now trophies of the past and features of decoration. Much of this is preserved at Hampton Court, Windsor, Warwick, and in many private chapels and chantries and other notable buildings.

In referring to examples of the grandest specimens of the windows of this period, it is impossible to avoid reference to buildings of more or less ecclesiastical character, as private chapels, etc.; and as one of the most marked features of the period is the "fan-groining" of its stone roofs in close juxtaposition with its grandest windows and glorious open-timber roofs, it seems not out of place to call attention to it as contemporary architecture.

In Henry VII's Chapel, contiguous to Westminster Hall, we have the most striking and magnificent example of this distinctive vault (erected between 1503 and 1512), the climax of stone groining. The vaulting-surfaces are hollow conoids, covered with a mazy network of fine ribs and serial panelling, from which depend fan-shaped pendentives of great size and richness. This is well shown in ordinary illustrations, but neither words nor illustration can convey an adequate idea of the beauty in execution of this wonderfully distinctive characteristic of mediæval architecture in England during the Tudor period.

The doorways are very pronounced, similar in general design to those of the Perpendicular period, more ornate with the pride of the time — heraldic devices, mottos or legends. The two-centred pointed arch had gradually become more and more depressed and was replaced by the Tudor, or four-centred, arch peculiar to the period; the outer and "label" mouldings were carried up square above the springing-level of the arched opening and across the head; the spandrels thus formed were filled with panelling enriched with carvings of the Tudor rose, crowns, portcullis, monograms, etc. These doorways were often projected and flanked by small semi-octagonal turrets with open panelling across the top.

Perhaps, however, one of the most characteristic features of Tudor architecture is the tendency to uniformity in external treatment as distinctly at variance with the spirit of earlier work. The central feature, usually the entrance-doorway, is strongly marked and more or less elaborated, but in the extension of the front and wings, one side matches the other, window for window, bay for bay, tower for tower, even to the extent of replacing windows with counter-balancing blank panelling. To this is added the ongrafting of Classic forms copied from pre-mediæval sources, which, however incongruous, produce effects of wonderful picturesqueness, as may be seen at Hatfield, Hardwicke, Wolterton, Burghley, etc.

We find, too, broad terraces with flights of stone steps flanked by ornamental stone parapets pierced with interlacing patterns, pedestals surmounted by griffins carrying shields or finials, all of very characteristic and quaint design peculiar to the period. Spacious gardens with broad walks, parterres bright with flowers, shrubbery, etc., are now common. Beyond the low surrounding garden-walls and through the open gateways stretch long avenues of trees, with views over broad domain of park-land, clumps of elm, oak, beech, ash, sycamore, chestnut, etc., the glades peopled with fallow deer and the elms alive with noisy colonies of rooks.

Hatfield, Haddon, Panshanger, Compton-Wyngate, Brereton, Kirby, Audley and Houghton Tower, Woodstock, are typical examples of the period and are all readily accessible to the student and well illustrated in Gotch's "*Baronial Halls*" and other works.

England is, indeed, rich beyond all other countries in examples of the stately and picturesque mansions of the Tudor period. The ways of olden times have not yet quite disappeared, for we find so recently as December, 1900, that Lord Edward Cecil, on his return from the seat of war in South Africa, was received at his ancestral hall at Hatfield with the picturesque rejoicings of feudal times. His carriage was escorted by tenantry of the estate bearing torches, and the family group, headed by the venerable Marquis of Salisbury, awaited his arrival on the steps of the old mansion to bid him welcome home again.

Hatfield is, perhaps, the most magnificent example of the late Tudor or Jacobean mansion of its kind to be seen anywhere; certainly none is more perfect. It was originally the palace of the Bishops of Ely and by them rebuilt and enlarged at the end of the fifteenth century; was confiscated by Henry VIII and made a

[1] Continued from No. 1374, page 29.

Royal Palace and occupied subsequently by Edward VI and Elizabeth. It was exchanged away by James I and came into possession of the Cecils at the commencement of the seventeenth century and was by them partially rebuilt and altered in a style that may be termed Late Elizabethan or Early Jacobean. In 1835 a fire destroyed a portion of the west wing, but this was rebuilt "after the original design."

The buildings occupy a parallelogram of about 280 feet long by 70 feet wide, the extreme length along the south front being 300 feet. The design is almost exactly symmetrically arranged, with large windows and bays. The hall, which is 50′ x 30′, is a good example of the late Elizabethan hall with its grand screen and coved plaster ceiling divided by richly decorated beams on boldly carved corbels, and may be named as an early departure from the open-timber roofs which were one of the glories of the early Tudor period. The walls are wainscoted and decorated by carving attributed to Flemish artists. The grand staircase[1] is another bold and very ornate feature. The gallery is 163 feet long by 23 feet wide and 16 feet high; the chimneypieces are very massive, with fire-dogs to the grates. The walls are grotesquely panelled and the ceiling richly panelled in plaster. This gallery is full of works of art, coats of mail and rare old furniture, including Queen Elizabeth's cradle. King James's room and the Library are also very fine rooms.

The introduction of ornamental plaster ceilings, modelled and moulded by hand, is one of the salient features of the late Tudor period, and is well illustrated in Gotch's splendid work on the "*Baronial Halls of England*."

There is still another style of building that, though it took its rise in the previous period, became very general in certain districts, and is especially illustrated by the many well-preserved examples of the old half-timbered houses erected at this time. These houses are found scattered throughout western Lancashire, Cheshire, Shropshire and along the banks of the Severn, Wye and Avon, and again in Kent. (See illustrations from the *Builder* and *Building News*, drawn by Maurice B. Adams.) These half-timbered houses were built of

Old Houses, Warwick, Eng.

heavy oak framing, mortised and pinned together at the joints, filled-in flush between the timbers with brick or lath and plaster. The work of similar class in the Midland Counties is of earlier date. There are numerous fragments of these old houses dotted all over these districts, many of great interest, sometimes surviving in a picturesque gable or two, part of a more modern barn, that must be left to the inquiring traveller to discover. Many most interesting examples are illustrated in Henry Taylor's "*Old Halls of Lancashire and Cheshire*," in Gotch's "*Baronial Halls*," Nash's "*Mansions of the Olden Time*," "*Picturesque Europe*," and in the publications of the *Builder*, the *Building News* and other current works.

The growth throughout the country of these old halls and mansions marks the rise in the wealth and consequence of the "middle," that is, the professional and commercial, classes of the period, as distinguished from the old nobility of feudal times and other great landed proprietors whose wealth was inherited, on the one hand, and the laboring classes on the other. The style of building is altogether different; it has no connection with the feudal times, there is no family sentiment, no pride of ancestral tradition or historic reminiscence about them. They were erected by self-made men, merchants and others, at a time when architectural taste was decaying — in times of peace and commercial prosperity — to secure to themselves such comfort, ease and luxury as they could afford according to the manners and ideas of the time. It is still truly historic or evolutionary architecture; that is to say, it is not a copy from preëxisting work, but the bona-fide growth and outcome of the life of the times.

We find in these half-timbered houses the large mullioned and transomed windows of many leaded lights, in which plain shields or circles charged with simple devices replace the heraldic glazing of the houses of the older families; huge fireplaces and quaint chimneys devoid of ornamentation, overhanging stories, and gabled roofs covered with the split flagstones of the neighborhood, or sometimes tiles in clay countries. Of these buildings we find beautiful and very perfect examples in Worsley Old Hall, near Manchester, erected in 1580; Alderley Edge, 1521; St. Peter's Hospital, Bristol,; Butchers' Row, Shrewsbury; houses in Warwick; the Oak House, West Bromwich; Speke Hall, near Liverpool, moated, erected 1593; the "Hall in the Wood," Bolton, 1598; Agecroft Hall, Cheshire, wood and plaster, 1561; Bramhall Hall, Cheshire, 1521; Darcy Lever Hall, near Bolton, 1541; Hanover House, Tunbridge, Kent, 1620; Holford Hall, Cheshire, moated, 1560; Little Moreton, Lancashire, moated, 1559; Ordsall Hall, Retford, Notts., brick and timber with curious oriels, 1560; Windsor Castle, the Curfew Tower and Horseshoe Cloisters, 1540; Severn End, Worcestershire; hospitals at Leicester, Coventry, and many others easily accessible and well illustrated by photography and in works before named.

This style of building, like the more pretentious stone buildings before referred to, continued with more or less modification in remote districts well into the Stuart period, developing the Jacobean style; but practically the mediæval style of architecture died out with Elizabeth, the last of the Tudors.

During the civil wars in the middle of the seventeenth century, the time of Cromwell, a great many of the old castles, like Kenilworth, Woodstock, etc., were more or less dismantled, destroyed and laid waste and ceased to be used as places of residence. Their ivy-clad ruined towers alone remain to this day to tell us of the lofty grandeur of those venerable old castles, the magnificence of their lordly owners and the warlike times in which they were built, and, alas! also of that cruel, barbarous reactionary period, the period of religious frenzy, during which social and political England was convulsed, laid waste and blighted with internecine wars.

We have now traced the parentage and birth of domestic mediæval architecture in England; illustrated its growth and triumphs, its brilliant springtime, its glorious summer and its golden autumn. But could it ever have been more beautiful, more fascinating, more intensely lovable than it now is in its gray, solemn ruins, mantled with the ivy of centuries? We see them as they are; we can picture them as they were, and, by the light of these somewhat discursive notes, we can re-people them with their lordly owners, reënact the stately pageants, the gay tournaments, and the pomps and circumstance of the times during which they were built. These now silent towers and crumbling ruins are the sole remaining witnesses of what England was during the Middle Ages. THOS. C. SORBY.

[To be concluded.]

[1] A good view of this staircase is given in Nash's "*Mansions of the Olden Time*."

THE INIQUITY OF THE ENGLISH LAW OF ANCIENT LIGHTS.[1]

I WILL not occupy your time with any preliminary remarks, but commence at once *in medias res* and say, my contention and conviction are that the state of the law in England today with regards to rights of light is little, if any, short of an iniquity.

The Prescription Act (2 and 3 Will. IV. c. 71, s. 3) enacts "That when access and use of light to and for any dwelling-house, workshop or other building shall have been actually enjoyed therewith for the full period of twenty years without interruption, the right thereto shall be deemed absolute and indefeasible, any local usage or custom to the contrary notwithstanding, unless it shall appear that the same was enjoyed by some consent or agreement expressly made for that purpose by deed or writing."

The result in practice being that if where two men own two contiguous plots of ground and one owner wants to build and does build at once and the other owner does not want to build, then notwithstanding that he may have every intention of building eventually — if owner number two postpones his operations for nineteen years he is unable to use his own land in accordance with his desire without being hampered by certain so-called rights his neighbor has acquired to access of light to his windows and other openings over number two land. In effect, my neighbor can dictate to me at what period I am to build on my own land by building on his own.

Again, if both owners build simultaneously, but A builds a more lofty edifice or a longer than B, B, if he is ever to increase the size of his building, must do so within nineteen years of A's completion or be practically debarred from so doing altogether, regardless of whether B has any need or wish or even whether he is able to extend his premises within that time.

One more illustration, this relating to old buildings. In an urban neighborhood, a large factory is required that will give employment to hundreds or thousands of hands, or a public authority wish to erect a town-hall, baths, library, workmen's dwellings or other institutions of public utility: both are hindered and harassed or altogether frustrated in their purpose because buildings not even on the same side of the road, and possibly the most wretched hovels, will be deprived of some light, ignoring the fact that the light which had been enjoyed was not provided for by the owner of the dominant tenement or at his expense or even by his forethought, but simply because the owner of the servient tenement had no need in the past to use his land in the same way or carry his building to the same height and extent as the owner of the dominant. Thus the most useful and necessary building we have imagined is curtailed in accommodation, marred in its usefulness and shorn of much of its beauty

[1] Portions of a paper read by Mr. Walter C. Williams, Solicitor, at the meeting of the Society of Architects on March 20, 1902.

for what, to my mind, is an inadequate reason. One could suggest innumerable cases of a kindred nature, but it seems needless to do so when speaking to an audience of practising architects who are, of course, acquainted with the salient features of the law on this subject and its practical results.

I cannot see the rule has any foundation in natural justice. I cannot see that it is defensible, either ethically or on the ground of expediency. Why should not a man have to make his own provision for the light to his building over his own land or over the public way? If he will not provide an open space on his own land to light his building, why should I have to provide one on mine for him, at any time, earlier or later? Now, how can an owner prevent his neighbor acquiring a right of light over his land? In one way, and one way only, and that is actual obstruction.

He may protest in the most emphatic and solemn manner, but it avails him nothing; he may give notices, but they give him no protection. No, wherever his neighbor has an opening in his building, overlooking his land or buildings, he must erect a hoarding (if he do not wish to build permanently) opposite to it.

The hoarding may have to be 60 feet high and 500 feet long, may be a hideous eyesore to the surrounding property, may be a most oppressive, even ruinous, expense, but up it must go, and must be retained there for a full year, for Section 4 provides that an interruption to be valid must be for one complete year. Hence you will see, gentlemen, that as soon as light has been enjoyed for nineteen years and one day there cannot be an interruption of one clear year before the expiration of twenty years from the time of its first enjoyment, though the owner cannot bring any action until the full twenty years have elapsed. It is obvious that in some cases this remedy may be as costly as the value of the land.

Even if expense do not stand in the way, in London (and, I believe, in many large provincial towns and cities similar rules are in force), but in London should such a hoarding be erected for the purpose indicated it becomes, under the London Building Act, an irregular or temporary structure, and requires the license of the London County Council or local town council for its erection or retention, and should this license be refused, as it well might, the owner is in this delightful position: he finds he is by one Act of Parliament precluded from doing the very thing which, by virtue of another Act, is the only thing he can do to protect himself from the encroachments of his neighbor.

There is yet another anomaly and hardship. A man may be entitled in remainder expectant on the life of a young or middle-aged tenant for life, say, stepmother or brother, only a year or so senior. During the life of the tenant for life rights to light may be acquired which the remainder man has no means whatever of preventing or resisting, because, as I have pointed out, he must actually physically obstruct the view of the poaching tenement; but, as tenant for life, he has no authority to enter on the land about to be affected to carry out the requisite work. It may be the remainder man was an infant, *non compos mentis*, or abroad; it may be the tenant for life has acted in collusion with the building party; all this notwithstanding, the remainder man has his inheritance depreciated in value by the acquisition of these adverse rights that he was powerless to prevent.

The same with a landlord whose tenant allows rights of light to be acquired over the demised premises. . . .

The easement of light, however, differs in its nature from other members of the family. Rights of way and rights of common may well be presumed to have been granted, as such easements may be almost of necessity, and, moreover, conduced to the convenience of the actual or supposed grantor as well as of those who enjoyed them. They are also always for the convenience of the many as against the strict right of the single owner, whereas the right of light is for the sole benefit of the single owner at the expense of all his neighbors.

Again, a riparian owner is entitled to the undiminished flow of a stream over or by his land, and if an owner up stream interferes with the flow in any way the property lower down is damaged, and that independently of any act on the part of its owner. But the claimant of right of light must himself have done in the past the very thing he now complains of in his neighbor, viz., have interfered by his own building with the access of light to his neighbor's property.

I contend that this judge-made rule is not founded on any consideration of natural justice or ground of public utility. On the contrary, the voice of justice seems to me to say that a man must light his premises over his own land or the public way; and public utility there assuredly is none, as the benefit is always to an individual at the expense of others. . . .

Before concluding I must refer to the laws of some foreign countries.

Now in Scotland our English rule has never been accepted. Erskine says, in his "*Principles of the Law of Scotland*": "This servitude cannot be constituted by prescription alone, for though a proprietor should have built his house ever so low, or should not have built at all for forty years together, he is presumed to have done so for his own convenience and profit, and therefore cannot be barred from afterwards building a house on his property or raising it to what height he pleases unless he be tied down by his own consent." Another writer says: "The theory in Scots law is that a proprietor is only bound to provide light for his own property, and any open space he may have is not to be reckoned on by his neighbor."

In Ireland also a man had to provide his own light as well for his land. The Irish law, however, is now assimilated to our own by Lord Carew's Act in 1858.

In the United States in 1837, shortly after the Prescription Act was passed, an American judge — Judge Bronson — expresses himself thus: "There is, I think, no principle upon which the modern English doctrine on the subject of lights can be supported. It is an anomaly in the law since the English doctrine of ancient lights has been repudiated in our courts. It cannot be applied in the growing cities and villages of this country without working most mischievous consequences. It has never, I think, been deemed part of our law." And he then refers to Kent's "*Commentaries*."

In 1893 the New York Court of Appeal held that an owner of property may place his windows overlooking his neighbor's premises, but the neighbor may build to the extremity of his land nevertheless.

In France it is provided that a man may not have a straight view or a window for sight or balconies or other projections on his neighbor's estate unless there is a distance of 19 decimetres between the wall on which they are made and the said estate; nor a side or oblique view on the same estate unless there is a distance of 6 decimetres.

The Italian code is similar, but the distances are slightly less.

Lower Canada maintains the French rule.

In Sweden a man must not construct windows nearer than 7 feet 9 inches to his neighbor's land.

So you see in none of these countries can a man rely on his neighbor for his light, but must make suitable provision for himself. Hence we see another example of the isolation of our beloved country; whether it be a splendid isolation, however, is a matter on which a man may "hae his doots."

Now, having briefly considered the state of our law as to light, and briefly how that state came about, and having heard the opinions which some of our judges entertain of the doctrine, and having taken a cursory glance at the law of other countries, I ask you, gentlemen, are you satisfied with the law of your own? If not, there is one remedy, and one remedy only — legislation.

This legislation need not be fantastic or complicated; it could be simple but at the same time effectual, both practical and practicable.

I would suggest an enactment providing that no further rights of light across another's land should be acquired. That existing rights should be extinguished: —

1. As to freehold, at the end of fifty years.
2. As to leasehold, at the expiration of fifty years, or the existing term, which period should be the shorter.

This would entail no hardship on any one, would do an injustice to no one. The man who had built would still have all that he paid for, his land and the materials on it, and the owner of adjacent land would enjoy his own in his own way without being jeopardized by the operations of his neighbor.

I can conceive some objection to this in the case of abnormally high buildings, but this might be easily provided for by giving owner of adjoining building, over, say, 50 feet high, a right — which, indeed, I think they would have without special provision, under the maxim, "sic utere tuo ut alienum non lædas" — to compensation, not for obstruction to their light *per se*, but for any general damage that might be actually proved in each case by appropriate evidence, as in suits to abate a nuisance.

It now only remains for me to acknowledge my obligation to Mr. Blythe's paper, read before the Incorporated Law Society, for the references to some of the older cases and for information as to foreign law, and to thank the Council of this Society for having honored me by the invitation to open this discussion, and you, gentlemen, for the patient attention you have given to my remarks.

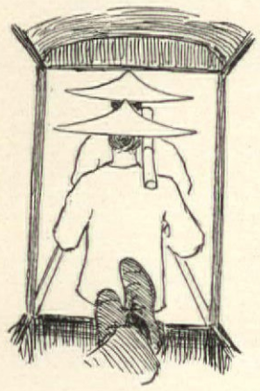
JOURNAL SKETCHES IN CHINA.[1]—IV.

CANTON.

As soon as the steamer made fast to the wharf a guide, who turned out to be a woman, was secured for me. Off we started in a drizzly rain through a maze of narrow streets to find the foreign quarter, where resided a few gentlemen to whom I had letters. A charming feature of the East is the unbounding hospitality of foreign residents; even the English become more like human beings when separated from their snug little island. Tempting as the proffered hospitality was, I had to decline, as my time was exceedingly limited and it was necessary that I should get as near the Chinese as possible. This was fully understood, and I was directed to a hotel on the other side of Pearl River which was in the midst of Chinadom and was kept by a Portuguese who had married a Chinese. I was also given a letter to Mr. Sampson, the Director of the Government school. Off we started again, my female guide appearing quite as masculine in her jacket as the other sex did with their smooth faces and hair-braids down their backs. A boat was engaged, literally the man's house, and he and his wife rowed us across the river. Opportunity was then offered for a further examination of this forest of boats that lined the shore in a deep layer for miles. It was interesting to peer into some of them and discover little domestic scenes; cooking, tinkering, children playing and, indeed, just those activities that one might see in a busy street. We finally reached the hotel, which was certainly all I could desire in the way of proximity to the Chinese. With the exception of the Portuguese landlord, I was

[1] Continued from No. 1377, page 53.

apparently the only foreigner in the region and the only guest at the hotel. I say hotel, for thus it was labelled on the outside. It was with regret that I gave up the comforts and quiet of European civilization in the Orient, with its tennis-courts, flower-gardens, whist, and the delights with which the English and Americans surround themselves. I use the word European, for the avoidable noises we produce in America are only equalled, not exceeded, by the Chinese with their fire-crackers, ear-piercing trumpets and gongs.



So-called Chair in which one travels.

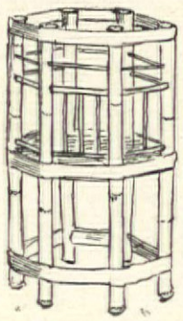
The landlord arranged for two palanquins, or chairs, as they are called, one being for my guide. Each of these was borne on the shoulders of three men, two in front and one behind. My first quest was for the Government school and Mr. Sampson, and away we went at a fairly rapid pace, through such sights, sounds and odors as one might expect to find on some other planet and a very addled one at that. The city of Canton is much cleaner than Shanghai. The narrow streets are paved with stone or big square bricks, and the buildings, mostly of one story, are all of brick, with thick, solid-looking walls. Narrow shops, or cells, consist in front of a wide doorway and a wide window through which one, without entering, may haggle for the goods displayed. The shops are rather dark within, as the streets are narrow, and overhead reed mattings, supported by wooden frames, provide a constant shade from the sun's rays, which in the latitude of Canton pour down with tropical fervor. The vertical signs with their gilt characters form a varied fringe on each side of the narrow, irregular streets, which in many cases are hardly wide enough for two palanquins to pass. The same activity is seen here, despite the heat, as in Shanghai. The crowded thoroughfares are still more congested by the various artisans carrying on their occupations in the middle of the streets, in fact, taking up both sides. The peripatetic carpenter, with his stock of tools and lumber, over which one has to step; the petty traders and fabricators, crowding the narrow lanes in a way that would not be tolerated in our country for a single moment; the hammering, planing, rice-pounding, the loud din of the coppersmith, the musical clink of the blacksmith's hammer, the multitudinous variety of weird street-cries, with the occasional rattling outburst of fire-crackers, all made up a perfect pandemonium. The three senses of sight, hearing and smell were incessantly assailed by interesting, ear-splitting, and disgusting impacts. It was all intensely absorbing and I had my eyes everywhere.

We had a long distance to go to reach the Government school, and the crowds through which we forced our way were anything but friendly. If the Chinese of Shanghai appeared rude and indifferent, the Cantonese appeared decidedly hostile, nor could I wonder at this attitude, for at the time of my visit the French were threatening their southern frontier and Manchu troops were passing through the city on the way to repel the expected invasion. Aside from this, there was not a man who was not more or less familiar with the history of the opium war and the calamitous horrors which accompanied it, when humiliation and death had come upon them in fullest measure from the hand of the hated foreigner.

On reaching the school I presented my letter and was received very kindly by Mr. Sampson, who at once conducted me to the recitation-room, in which were five students. They all rose and said, "Good morning," like a set of automatons. Mr. Sampson requested them to read in turn from an English history and this

School, Canton.

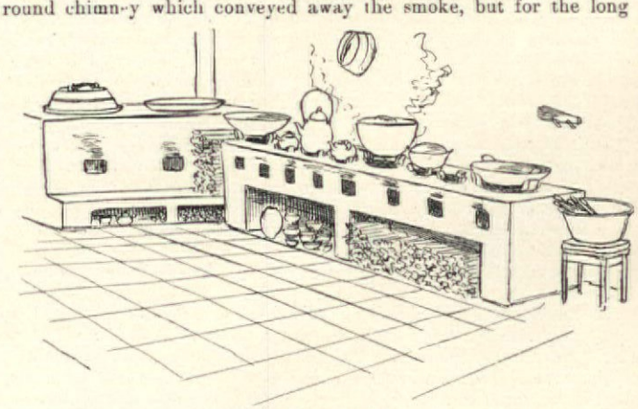
they did fairly well. On my expressing surprise at the smallness of the class Mr. Sampson told me that one of his greatest difficulties was to impress upon the pupils the necessity of punctuality; some days there would be a dozen or more in the class and at other times none. Here, in a city of a million of inhabitants, was this one little school to satisfy the demands of the people for a knowledge of foreign studies. I could not help contrasting this with Tokio, having the same population, with its great University, every student of which becomes well versed in English before entering; the great Medical College, every student of which has to understand German before entering; the College of Engineering; the Foreign Language School, where a knowledge of French, German, Russian and Chinese is required; the School of Chemical Technology; the Military and Naval College, all with their foreign professors and instructors, and the modern languages taught in the normal and high schools, and the Nobles' School, as well, and thousands upon thousands of Japanese students punctually attending the classes of these institutions until graduation. What a contrast! And yet many English writers regard this hunger for knowledge with contempt, and esteem the Chinese as superior, basing their judgment on their own leading characteristic as a nation of shop-keepers, which quality has dominated nearly all their foreign wars and their acquisition of foreign territory. Here in China they find their match in the astute Chinese merchant, who is equally honored and respected with them.



Baby's High Chair.

The school consisted of a few private dwellings which had been brought together into a series of connecting rooms by simply knocking a few holes through the thick partition-walls of the various houses alloted for the purpose. A plan of Canton with its houses would resemble a gigantic honeycomb, the cells being quadrangular instead of hexagonal. Mr. Sampson kindly permitted me to roam over the premises at will and I secured a number of sketches. Many of the features were quite unlike those of the Shanghai house, though the reception-hall was planned like the northern one and the minor details of work and ornament were somewhat similar. I may add in passing that the people are different, their language is different and a man from Shanghai is not only regarded as a foreigner, but is rather brusquely treated as one. In Shanghai I had acquired a few expressions such as "thank you," "good-morning," "good-by," etc., which had always been understood when I ventured to use them; here in Canton not a single expression was understood. I was told that the two languages were as different as Spanish and Portuguese or Italian. They all use the same characters in writing, however. These characters are conventional symbols, each one representing a word or an idea and hence called ideographs. Over this vast Empire, as well as in Korea and Japan, the written language is the same. Throughout the Chinese Empire there are a number of languages and hundreds of dialects. The characters, to the number of thousands, which have come down from the dim past have the same meaning. The Chinese must have had, early in their history, the example of phonetic writing on their western borders, but have persisted to the present time in using this archaic and cumbrous device in expressing their thoughts.

My first hunt was for the kitchen, for here is an ethnic feature associated with family life that persists without change for generations. It is this feature that is rarely described or figured in books, and for that reason I made a special effort to secure sketches when opportunity offered. The kitchen range was long and had accommodations for many cooking-pots. Each opening had three spurs, or supports, so that the vessel was held some little distance above, as in the little braziers in Japan. Here, also, I saw in an open place under the range a number of braziers or pottery cooking-devices in which charcoal was used for fuel; in another space wood was piled. The rice-kettles were large and somewhat shallow; the cover had the appearance of a shallow tub inverted. Mr. Sampson informed me that the Chinese often utilized the steam arising from the boiling of rice in cooking other kinds of food In the rice-boiler range was a round chimney which conveyed away the smoke, but for the long



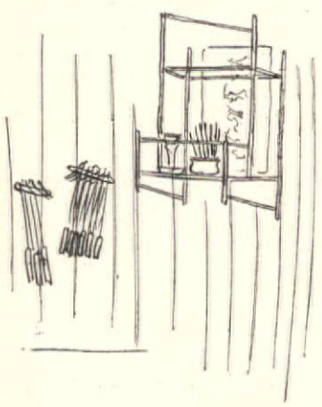
Kitchen Range, Canton.

range I failed to note a chimney, if there was one. The walls of the kitchen were sufficiently blackened to indicate that no flue existed. At the end of the long range was a large jar in which were various wooden ladles for convenient use, and above a huge bamboo brush, or stirrer, was resting on two pegs. The materials used in the construction of these ranges were stone, brick and cement and appeared

strong and durable. Here, however, the differences ceased. The resemblances to the Shanghai kitchen were again seen in the same amount of dirt and disorder; the floor was grimy with dirt — street dirt tracked in — broken jars lying about and everything indicating a shiftlessness past belief. At the opposite end of the kitchen was a

Kitchen, Canton.

little shelter where sat the cook, who smoked his pipe while waiting for the kettle to boil. It was amazing to see the tumbled-down shanty provided with the most elaborately designed window-sashes, the details of which I had no time to sketch. The carvings over the door and the various intricacies had all to be omitted in these rapid memorandum outlines. The kitchen shrine was high on the wall near the rice-kettle. It was a rough bamboo framework capable of holding a device, in which candles were burning; near by were a number of candles made on long sticks. These were stained or painted red and at the ends of the sticks cross-pieces of bamboo were tied so that they could be hung on a peg, as shown in the sketch. A number of Chinese gathered about me curious to know what my purpose was in sketching, and Mr. Sampson, who spoke Chinese, asked them what they thought I was drawing, and they replied that the foreigner was about to build a house and was getting ideas how best to do it.



Kitchen Shrine, Canton.

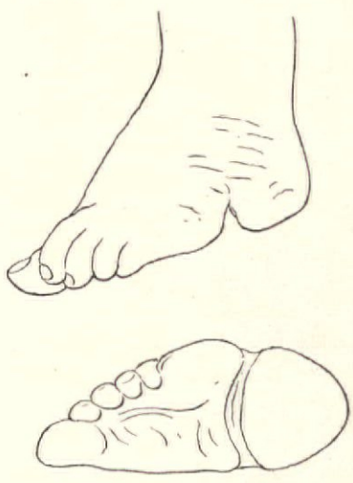
From the kitchen other rooms were visited. One room, evidently a study, had a very large window opening into a little garden. On the garden-wall opposite the window was a strip of paper on which were written four Chinese characters, which after some trouble were rendered into English as follows: "May fortunate light illuminate the garden." The translation of these inscriptions in China always comes as a surprise to the foreigner. Many of them express the highest emotions — a love of cleanliness, exalted piety, tender compassion, etc.; and then one contemplates the people with their cruelty, their filth, their ignorance, the abject position of women, and it is realized that the inscriptions are words — empty words, conveying no more meaning to them than if they had been written in Coptic. I suppose it may be justly said that the moral teachings of Christ have in the same way lost their potency among Christian nations. Dr. Gustave Schlegel translated an inscription in a Canton gaudy boat which read, "Among pure breezes we enjoy the moonlight." It may be said with truth that the Chinese, in the cities and villages at least, are deprived of this enjoyment. I was shown a few bedrooms, and here, as in Shanghai, the bedsteads were ponderous affairs having a high frame with tester above and curtains pendent.

The sanitary arrangements were simply abominable. In the three thousand years and more that the Chinese have been a nation, natural selection has rooted out all those who could not survive these flagrant violations of all sanitary laws, the survivors being evidently immuned against microbes that would kill a European outright. The same curious selection has doubtless taken place in some of our older New England towns where the native can drink the well-water with impunity while the stranger is affected at once.

In no other part of the world, unless it be in Russia, can such depths of filthiness be found as in the cities of China. Mr. Arthur H. Smith, in his interesting work entitled "*Chinese Characteristics*," says that, "No matter how long one has lived in China, he remains in a condition of mental suspense, unable to decide that most interesting question, so often raised, Which is the filthiest city in the Empire? . . . The traveller thinks he has found the worst Chinese city when he has inspected Foo-Chow, he is certain of it when he visits Ning-Po, and doubly sure on arriving at Tien-Tsin, yet after all it will not be strange if he heartily recants when he reviews with candor and impartiality the claims of Pekin!"

. . . . . .

The curious custom of compressing the feet of women, thus in a way rendering them cripples for life, is always alluded to in books on China. In the Peabody Museum of Salem are a few casts of this peculiar deformation made by the late Dr. G. O. Rogers, formerly of Hong-Kong. By the accompanying figure of one of these casts it will be seen that the four smaller toes are made to partially bend under the big toe and that the heel is also brought forward. This is accomplished by tight bandaging and usually begins as soon as the child is able to walk. According to Williams (see "*The Middle Kingdom*," Vol. II, p. 38) this practice is not confined to the higher classes; on the contrary, all classes of society, even the poorest, strive to be in fashion. The Tartars, though becoming Chinese in most matters, have had the good sense to let their women's feet develop normally. As to the origin of this savage custom Dr. Williams says, "A difference of opinion exists respecting its origin, some accounts stating that it arose from a desire to pattern the club feet of a popular Empress, others that it gradually came into use from the great admiration and attempt to imitate delicate feet, and others that it was imposed by the men to keep their wives from gadding; the most probable accounts do not place its origin further back than A. D. 950. . . . The appearance of the deformed member when uncovered is shocking, crushed out of all proportion and beauty and covered with a wrinkled and lifeless skin like that of a washwoman's hands daily immersed in soap-suds."



Plaster Cast of Compressed Foot.

. . . . . .

I was much interested in the archery methods of the Chinese, and an assistant in the school, a Manchu, illustrated their way of releasing an arrow from a bow, and also the manner of stringing a bow. The attitude of the hand in pulling the string differs greatly in different races. The Mongolian draws the string back with his thumb, the forefinger being bent over the end to strengthen the hold and the arrow being held in the crotch made by the junction of the forefinger and thumb. In this method a ring is worn on the thumb to engage the string and to prevent the thumb from being lacerated. That this method is very ancient is seen in the frequent allusions to the subject in the Chinese classics. In the "*Shi King*," or book of ancient Chinese poetry (translation of Legge), the thumb-ring is called a thimble and also a *pan chi*, or finger regulator: "With archer's thimble at his girdle hung," and, again, "Each right thumb wore the metal guard." The Mediterranean nations draw the string with the tips of the first three fingers, holding the arrow between the tips of the first and second fingers. The very lowest savage races pull the string by holding on to the arrow with the thumb and forefinger; a little more advanced savage assumes this attitude supplemented by bringing the second and third finger on the string and thus getting a stronger pull. I have dealt with this subject more fully elsewhere.[1]

Stringing a Bow.

The stringing of the bow is somewhat peculiar. The bow when unstrung turns back upon itself and is so short when in this state that it occupies but little room and may be carried in a convenient case. In stringing the bow the archer places one end upon his left knee, the bow passing under the right leg, then by pulling up the right end of the bow he can slip the loop of the string into the nock; or, the bow is bent over the knee as in the attitude of breaking a stick and an associate slips the loop into the nock. Great care is taken of the bow and a box is contrived for it in which charcoal is burned to preserve the bow in a perfectly dry condition.

EDWARD S. MORSE.

[To be continued.]

[1] "Ancient and Modern Methods of Arrow Release." *Bulletin* of the Essex Institute, Salem, Mass., Vol. XVII.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

BRAMHALL HALL, ALDERLY EDGE, ENGLAND [1521]; — WOLLATON HOUSE.

WORSLEY OLD HALL, MANCHESTER, ENG. [1580]; — HARDWICK HALL.

ST. CATHERINE'S, NEAR BATH, ENGLAND; — SOUTH SIDE OF COURTYARD, KIRBY HALL.

BRERETON HALL, NEAR CONGLETON, CHESHIRE, ENG.: — THE QUAD: BRAMHALL HALL, CHESHIRE, ENG.

FOR this and the preceding plates, see references in the "Domestic Architecture of England in the Middle Ages," elsewhere in this issue.

DIVERS DETAILS IN PYRÉNÉES ORIENTALES, FRANCE.

THIS plate is copied from Baron Taylor's "*Voyages pittoresques.*"

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: — "THE FOOTBALL-PLAYER." MR. DOUGLAS TILDEN, SCULPTOR; — "MICHAEL ANGELO." MR. PAUL W. BARTLETT, SCULPTOR.

[The following named illustration may be found by reference to our advertising pages.]

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: — VASE; — DIANA TRIVIA.

NOTES AND CLIPPINGS

MYSTERIOUS FIRES IN TALL BUILDINGS. — A recent fire in one of the tall office-buildings in Chicago developed a feature which is worthy of consideration on the part of fire-department officials in the larger cities. Although in the case referred to not much damage was done it was noticed that the flames went up the elevator-shafts with extraordinary rapidity, considering that in this particular building there was nothing for them on which to feed. When an investigation was made it was found that the steam-pipes, instead of being covered with asbestos, as the law demands, had been covered with some inflammable material. There had been one thin layer of asbestos paper, then a thick layer of felt and, finally, a canvas covering. When a match was put to the felt it burned like tinder. This discovery explained at once several mysteriously rapid fires in "fireproof" buildings, and a thorough investigation of pipe-coverings all over the city is to be made. Possibly, it would not be a bad plan to have a similar investigation made in New York and other large cities where lofty "fireproof" buildings exist. — *Metal Worker.*

THE CUMBERLAND ROAD. — The most remarkable highway built in the United States early in the nineteenth century was the so-called Cumberland Road, which was to extend from Cumberland, Md., through southwestern Pennsylvania, over the Alleghany Mountains to the Ohio at Wheeling, W. Va., and then on to St. Louis. It was so well constructed that it is a good road to-day. Henry Clay was its projector and chief supporter, and his services in its behalf are commemorated by a monument near Wheeling. We are told by letters written at that period that "there were sometimes twenty gayly painted four-horse coaches each way daily. The cattle and sheep were never out of sight, and canvas-covered wagons were drawn by six to twelve horses." On this great road, which eventually passed into the hands of the States through which it runs, the Government expended no less a sum than $7,000,000. Within a mile of it on either side the country was a wilderness, but on the highway itself the traffic was as dense as in the main streets of a large town. Ten miles an hour was the usual speed for coaches. From Baltimore to Wheeling ran lines of freight-wagons, which carried ten tons, drawn by twelve horses and with wheels 10 feet in diameter. — *Pearson's Magazine.*

SUBMARINE ROMAN REMAINS OF THE ITALIAN LITTORAL. — The British Consul at Naples remarks in his report for the past year that it is strange that, in spite of all the interest taken in southern Italy, and especially in the neighborhood of Naples, in archæology and exploration, no definite chart has ever been made of the important Roman remains beneath the sea, which stretch almost without interruption from Naples to Baia. It has been left to the British Association to undertake this task, and under its direction Mr. T. R. Günther, of Magdalen College, Oxford, has been engaged for some months in making a detailed survey of the Roman structures beneath the sea. From his notes it appears that the sea-level has risen about 20 feet since the era of their construction, and has covered many villas and piers, and probably also a road, which seems to have existed along the coast of Posilipo. Mr. Günther's survey will be of great practical value, apart from its scientific interest, because many boats run upon those old foundations annually, and only last year a steam-vessel of the Italian navy struck on one of them. This danger, however, is chiefly to pleasure-boats, and owners of yachts need to be especially careful when running along the coast in steam-launches. No less than three of these crafts have had narrow escapes in recent years. A careful record of the tides has been kept for some time, observations being made several times a day. The figures show the rise and fall to be greater than has been generally supposed, and also that the level of the Mediterranean is less influenced by the action of the wind than has been supposed by some observers. — *N. Y. Evening Post.*

AN ELECTRIC-HEATING DEVICE. — A system of heating houses and cars which combines the hot-water and electrical systems has been devised by a New Haven inventor. It is claimed to represent high efficiency and to give a uniform and most pleasant heat. The heater itself is made up of but few parts and is yet durable and inexpensive. It is composed of castings which form the connecting-heads and circulating-flue or water-chambers, around which are placed the electric-coils of high resistance. The latter are perfectly insulated by lava and specially prepared cement. The heads of the castings are made to receive iron plates, which are held in place by screws, and form a casting around the coils. The heat is controlled by a switch made to use in connection with this heater, and with its use the current is reduced without the aid of any external resistance, thereby keeping all the heat within the heating-apparatus. In the application of this system the electric water-heater is placed in the cellar in place of the ordinary coal-burner, the rest of the plant being the same as with the ordinary water-heating installation. The controlling switch may be located in any part of the house that may be desired, from which point the temperature of the entire structure may be regulated. The convenience of such a system will be apparent to any one. There is no handling of fuel or ashes, and there is also the advantage of instant adjustment. The principle has been applied to the radiator with an expansion tank and pig and circulating-pipes, thus forming a portable electric-heating system with a flexible-cord connection with the electric-light bracket. — *Boston Transcript.*

PRICE OF LUMBER LIKELY TO RISE. — John S. Gildersleeve, of Cleveland, who had been one of the group discussing the meat situation, said recently: "Perhaps the same complaint will be made when the price of lumber goes up, as I am told that it will do before very long. The prices now prevailing are said to be in all probability the lowest of the year. I was talking to-day with a New York lumber-dealer who cuts each year 30,000,000 feet of lumber in the northern sections of the East. He says that, because of the peculiar conditions this winter, the early thawing of the snow and the heavy rains, which washed out the logging roads, most of this winter's cut of timber will have to lie in the woods until another season, and where he should have now, with his reserve, 40,000,000 feet of timber in the ways, he has but 15,000,000. This will cause what might by some people be unjustly called a corner. No more wood can be got out into the market, and he can make a higher price on his lumber, but it is a natural, not an artificial, corner. In order to supply his trade and meet the regular orders that are sure to come in, he will not sell out his 15,000,000 feet at once, as he could do, but will make his own price, and sell it as his orders come in. No one can justly blame him for doing this." — *N. Y. Tribune, April* 20.

"LLOYD'S REGISTER'S" NEW BUILDING. — "Lloyd's Register," the new building just erected at 71 Fenchurch Street, is beyond question the most gorgeous of the many palaces of commerce in the city of London. Its total cost, £100,000, is perhaps not particularly striking until its comparatively small size is remembered. In comparison with its size, the new building is perhaps the most costly in the Kingdom. "Lloyd's Register" must not be confused with "Lloyd's," the society of underwriters. The Register exists for classifying the ships of all nations. Here it is decided in which class to place a new vessel for insurance purposes, and it is in the power of the committee of this institution to award or withhold their highest diploma of "A1 at Lloyd's." Constructed of the finest Portland-stone, the building is a thing of great architectural beauty from the outside. The carvings on the porch and the bronzes between the pillars are by Mr. Frampton, R. A., and are executed in his best style. The weather "cocks" are two little ships of copper-gilt, one a modern liner and the other an ancient fifteenth-century sailing-boat. Valuable marbles, inlaid woods, mother-of-pearl, and even jewels have been utilized in the decoration of the interior. Mr. T. E. Colcutt, the architect, gave the writer some detail of his work, which in beauty of design and wealth of decoration is indeed a masterpiece. "Quite the costliest part of the building," said Mr. Colcutt, "is the frieze of Mr. Lynn Jenkins representing a procession of mediæval ships. The vessels are of bronze, the sky of mother-of-pearl, and the figures of bronze with ornaments of real sapphires. The supporting pillars are of polished marble. The mantelpiece is exceptionally beautiful carved marble. The fire-dogs, of old Italian work, stand 6 feet high, and are worth £500. Even the clerks' office is more suggestive of a palace than a business-house, for it is lined with marble, and the electric-light fittings are of beaten copper. The story of how the new luxurious building came into existence is rather interesting. For classifying ships "Lloyd's Register" charges certain fees. The income more than covered the expenses, and a large reserve-fund accumulated. For the disposal of this sum, outside the defraying of expenses, there was apparently no provision, so, finally, it was decided to expend it upon a building that should do credit to London and take a high place among the commercial palaces of the world. — *London Mail.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, MAY 31, 1902 No. 1379

CONTENTS

SUMMARY: —
The New Insurance Engineering Experiment Station. — Is the Efflorescence on Brickwork an Indication of Danger to the enclosed Steel Frame? — A Massachusetts Warning to Architects invited to give Bonds. — Reported Need of Fresh Soil for Central Park, New York. — A Movement to allow Free Entry to some Works of Art. — Statues of New York Notables as Architectural Embellishments. — Competition for an Electrolier. — Development of the Pratt Institute, Brooklynn, N. Y. 65
NOTES ON IRON AND STEEL CONSTRUCTION. — VII. 67
A FEW PARIS JOTTINGS. 70
MUNICIPAL SOCIALISM. 70
ILLUSTRATIONS: —
No. 409 Commonwealth Avenue, Boston, Mass. — Entrance-porch to the Same. — First Baptist Church, Arlington, Mass. Pan-American Exposition, Buffalo, N. Y.: The Propylæa, from the Sunken Garden; — Pergola. 71
COMMUNICATION: —
The Registration of Architects in New Jersey. 71
NOTES AND CLIPPINGS. 72

THE appeal of Mr. Edward Atkinson for funds to establish an insurance engineering experiment station seems to have met with an immediate and liberal response from the manufacturers who, under his wise guidance, have come to appreciate, perhaps better than any one else, the incalculable value of intelligent precautions against fire; and the Experiment Station has already been organized, and will begin its work with such resources as are now available, under the charge of Prof. Charles L. Norton, of the Massachusetts Institute of Technology. Architects will be glad to hear that the first problems to be solved will be those relating to fireproof construction, particularly in respect to the corrosion of metal skeletons encased in masonry; and we hope that the managing officials, all of whom are officers of mill mutual insurance companies, will forget the usual underwriter's scorn for architects long enough to invite from some of the latter suggestions as to the varieties of construction to be tested. For example, architects understand, much better than mill-engineers or insurance-men, the departures from the standard construction which really constitute the greatest danger in modern steel-frame buildings. The steel skeleton, conscientiously buried under a foot of solid, well tied and well grouted masonry, can, so far as our present knowledge indicates, be safely left, at least for a few months, while the Experiment Station is studying the present, and probable future, condition of those "wonderful" structures, run up in a few weeks, with bolted joints, and cased with four inches of loosely-fitting brickwork, in which so many millions of dollars have been invested within the past ten years. One of the most recent innovations in these "wonderful" buildings is said to be to lay the wooden floors without any sleepers or nailing-strips whatever, driving the flooring-nails simply into the cinder concrete. An investigation into the length of time that floors laid in this way will stay in place would be of interest to owners, as well as to architects. The action of cinder concrete, made in the usual manner, and of the plaster-of-Paris beam-filling, used in some varieties of fireproof-construction, and of acid hard plasters, on the steel structure which they are supposed to protect, is also a matter of vital importance. It may be observed that the use of plaster-of-Paris for repairing, and filling-out deficiencies, in terra-cotta work is not wholly unknown, and, perhaps, the first portions of most steel structures to show signs of corrosion will be found to be the portions under the windows, where the water soaking through stone sills, or through the joints of terra-cotta sills, keeps the masonry generally moist, even if it does not carry with it acid substances in solution.

SPEAKING of the difficulty which architects find in determining technical questions of this kind for themselves, and the bewilderment into which they are thrown if they attempt to gather instruction from the "expert tests," lectures, "papers" and so on, by eminent professors, engineers and others, accounts of which reach them by nearly every mail, it might be well to call the attention of the new Experiment Station to the peculiarities of certain bricks, and their possible influence upon structural steel embedded in them. Architects were informed, not long ago, that such steel rusted only under the influence of carbonic acid, and that, when surrounded, even at a certain distance, by masonry, the cement in the masonry captured all prowling particles of carbonic acid, so that the steel could never be attacked. Now, even in steel-frame structures, and, perhaps, particularly in them, the bricks used are often seen to be covered with a white efflorescence. This efflorescence varies in composition, but, as chemists tell us, it often consists, wholly or in part, of sulphate of magnesia, and its presence is attributed to the combination of sulphuric acid, derived from the sulphur in the coal used for burning the bricks, with something in the clay of the bricks, or in the cement used for laying them. Now, sulphate of magnesia is an acid salt, capable of corroding iron rapidly, and the simple-minded architect, when he sees a sheet of what he supposes to be this substance on the outside of a four-inch brick wall, the inside of which is in contact with a steel frame, may be forgiven for wondering whether the metal within is not experiencing some effect, and for asking himself why the masonry which catches carbonic acid so cleverly should let sulphuric acid escape in such quantities. Naturally, we are far from presuming to answer these questions, but the founders of the Experiment Station may be assured that no one will study the results obtained by it with greater interest and gratitude than the architects.

THOSE architects who enter competitions in which they bind themselves, if their design is selected, to furnish security that the contract price will not exceed a certain sum, and who imagine that this is only an innocent formality, will do well to take warning from what is now going on in Massachusetts. One of the most prosperous cities in this Commonwealth proposes to build a high-school, and has issued a programme of competition in which, among other things, it is stipulated that the cost of execution shall not be more than one hundred and eighty thousand dollars, and that the successful competitor shall give bonds "in a reasonable amount" that this limit shall not be exceeded. One of the architects invited to compete, having, presumably, something to lose, and entertaining a wholesome distrust of "mere forms" in the shape of bonds, asked the chairman of the committee in charge of the matter certain questions in regard to the bonds which would be required, and received replies in writing. To the first question, whether, in case the contractor should fail before the expiration of his contract, and it should become necessary to make new contracts, at an increased price, for the completion of the building, the architect's bond would be forfeited, the answer was "Yes." To the second question, whether, in case prices of material or labor should advance during the period between the selection and the letting of the contracts, so as to make it impossible to contract for the building for the specified sum, the architect's bond would be forfeited, the same answer was returned. The third question was whether the architect, in case the lowest bid on the completed plans and specifications exceeded the limit, would be discharged without pay, or would be directed to modify the drawings and specifications to reduce the cost to the necessary extent; and the reply to this was that he would be discharged without pay.

THE programme of competition, in this case, is quite free from the odor of cheating rascality with which so many documents of the kind reek, and the committee seem really to wish to get the best building that they can for their money, yet a proceeding less calculated to bring about that result could hardly have been devised. No provision is made for expert advice in making a selection, although, without such advice, the committee is as likely to choose the worst design as the best. We have known a very intelligent committee to select a plan for a high-school in which the main entrance-hall was, practically, without light or air, and it was not until their expert advisers pointed out to them the absence of windows that they regretfully abandoned their choice; and the amount of money which is spent in altering buildings, particularly school-houses, to correct defects in plan which an expert would have seen at

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

once is something startling. The committee in the present case, by assuming the selection, not only make it tolerably certain that, if they choose and carry out any plan, they will either have to alter their building later, or impose upon the children who are to use it the annoyances and fatigues which are the result of unskilful planning, and which, multiplied by the number of people who suffer from them, constitute a heavy burden on the community, but, by that circumstance alone, they keep capable and skilful architects from accepting their invitation. In England, and in the larger cities of this country, it is considered that an architect who enters a competition which is not to be judged by an expert does so expecting to win, if at all, by unfair means; and those who depend upon the merit of their work for recognition will not compete with him. Moreover, as if to make doubly sure that no respectable architect will enter the contest, the committee imposes on competitors a money forfeit which is, for an architect, pure gambling, with loaded dice in his adversary's hands. An architect who has entrusted his property in this way to a building-committee can be robbed of it at the pleasure of the committee, by collusion between contractors, or by any one of a variety of accidents which he is powerless to prevent. It is true that the pretexts on which his money would be confiscated would rarely bear the test of a judgment of court, but it must be remembered that possession is nine points of the law, and the mangled remains of his savings which he would receive after two or three years' fighting would not make up for the loss of time involved in the contest.

ARCHITECTS, who often have to advise in regard to the grading and planting around the houses which they design, may find instruction in the report of interviews with the officials of the New York and Brooklyn parks. Some one, observing that signs were scattered plentifully around the New York Central Park, warning people to keep off the grass, while, in Prospect Park, in Brooklyn, there were no signs, and visitors were permitted to walk about freely, made inquiries, and found that, while walking over the sod in the Central Park was destructive to it, that in Brooklyn would survive almost any treatment. Application to Mr. Samuel Parsons, the landscape architect of the New York parks, brought out the interesting information that the difference was due to the thinness of the soil in the Central Park as compared with that in Prospect Park. According to Mr. Parsons, the vegetation in the Central Park is in a dying condition, for want of suitable and sufficient soil, and nothing but the greatest care and vigilant protection against ill-treatment can keep it in tolerably presentable condition. The site of Central Park was, originally, a rocky tract, with barely enough grass growing in the crevices of the ledges to feed the goats pastured there. Naturally, the goats made short work of any young trees that might endeavor to grow in the richer spots, and the place, although it presented a picturesqueness which is still one of its most attractive features, was far from suggesting luxuriant vegetation. To secure anything like shrubbery and grass, soil had to be brought from a distance, and spread over the rocks and gravel. This soil has supported the vegetation of the park until now. Unfortunately, the cost of soil made it seem necessary, when the park was first laid out, to limit the quantity used, and it was spread out too thinly. Now, in Mr. Parsons's opinion, the trees and grass, if they are to be preserved, must be supplied with fresh soil, to an average depth of two feet. The cost of this, including that of spreading and replanting, would be a million and a half, and even now, when the Central Park has become the most valued ornament of the richest city but one in the world, it is impossible to get such a sum appropriated for the purpose. Some years hence, when the shrubs are dead, the trees reduced to unsightly stumps, and the grass-plots to patches of alternate brown and green, public opinion will demand the necessary expenditure, but this must then be much greater, and young plants and trees must be set out to take the places of the old ones which no treatment can save.

A MODEST attempt has been made at a beginning of amelioration of the present tariff laws of the United States in regard to works of art, by the introduction of a bill in the House of Representatives, by Mr. Lovering, of Massachusetts, providing that statues, paintings, drawings, engravings and etchings may enter this country free of duty, if they were executed more than fifty years before the date of importation. This reservation, it will be seen, still protects the tin-can artists of the United States against the competition of the Raphaels and Michael Angelos of the effete countries of Europe, for the reason that, as tin-cans were little known fifty years ago, the "pauper labor" of the artists of the Renaissance was devoted almost exclusively to other objects; and it seems as if the most inveterate champions of American "infant industries" could find nothing to object to in the bill. Whether it will be passed is, however, another question. The defenders of the protective system appear to have determined not to permit any change, however innocent or desirable, in the present tariff. The consequence of this attitude will be, as it seems to us, that the people who, in constantly increasing numbers, are aggrieved or injured by the injustices and anomalies of the tariff, finding that it cannot be modified, will have no alternative but to join in destroying it, with the most deplorable effect upon business of all kinds.

IT is welcome news that New York in the sculptural adornment of its public and semi-public buildings seems likely to differentiate itself permanently from such cities as Berlin and Vienna, where the unthinking facility of architectural sculptors has wrought such deplorable results upon and over façades that have in them at least the elements of architectural serenity. Almost any sculptural treatment would be better than the allegorical imaginings of the German *Bildhauer* as they sprawl or crawl over the broad surfaces or contort themselves so as to crowd into the odd corners of what are really fairly decent façades. Up to the last decade, or until since the Chicago Fair, architects hardly dreamed of employing more than capitals and ornamented string-courses in their buildings, though the far-seeing ones had begun before that to build into their structures the rough blocks in which might perchance be hewn a bit of sculpture in high-relief or in the round — at some time dimly perceptible. Almost the first pieces of real sculpture applied to an American building in a structural sense are Daniel C. French's fine marble groups over the main entrance to the Boston Post-office — too high up to be fairly seen, but even there telling and certainly good. It is matter for gratulation that he is to make a statue of De Witt Clinton for the New York Chamber of Commerce, while Philip Martiny is to model statues of Alexander Hamilton and John Jay for the same building. These figures, following the example of those modelled by J. Massey Rhind for the Exchange Court Building, would seem to establish a fashion of utilizing American notables for decorative purposes which may spread, and with happy artistic effect, so long as the garments of to-day are not too much forced on the attention by the sculptor.

THE Municipal Art Society of New York announces its competition for designs for an electrolier, to be placed on the "island" with which the municipality proposes to divide the traffic at the intersection of Fifth Avenue and Twenty-third Street. The island will not exceed in size eight by twenty feet, so that the electrolier must not be too large to be comfortably accommodated on a plot of these dimensions; and it must be comparatively simple, the limit of cost being fixed at fifteen hundred dollars. Designs or models must be delivered, under motto, to the Secretary of the Municipal Art Society, at the building of the Architectural League, West Fifty-seventh Street, on or before six o'clock in the evening of June 11. They must be accompanied by a brief specification, and by an envelope, sealed with wax, bearing on the outside the competitor's motto, and having his name and address inside. The jury consists of ten artists and architects, and five laymen, and the author of the design placed first will be employed to furnish full-size drawings, and such modelled details as may be necessary for the execution of the work, receiving for these services a fee of five hundred dollars. The second prize will be one hundred dollars, and the third fifty dollars.

THE Pratt Institute, in Brooklyn, N. Y., has developed with a rapidity which shows conclusively that it has supplied a want widely felt. In 1887, it had twelve students; in 1901, it had more than three thousand. With the rest, and perhaps even more than the rest, the Department of Fine-Arts has increased in importance, until, from a single studio, it now includes thirty. The facilities available for the necessary study have led the Trustees to establish a two-years' course in architecture, designed more particularly to train students for efficient and responsible work as assistants in architect's offices. The programme indicates that this object is attained, so far as is possible in a two-years' course.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — VII.

THE columns in the modern building, and especially in the construction known as the skeleton type, are the most important members or elements in the structure. They may be either of cast-iron or structural steel. When of the former they are usually of a hollow cylindrical or rectangular section, when of the latter, it is customary to build up the section of rolled shapes and plates securely riveted together throughout their length. There is much debate between engineers regarding the relative efficacy of cast-iron and structural-steel columns. It is a fallacy to suppose that cast-iron behaves badly in case of fire, and that columns of this material upon being suddenly cooled are subject to fracture by unequal expansion. A systematic examination of the results of fires in buildings shows that cast-iron columns stand remarkably well — in fact, have fire-resisting qualities superior to columns of structural steel. The principal disadvantage in the use of cast-iron columns consists in the fact that it is difficult to make rigid connections between the columns of the several tiers, and cases have occurred where tall buildings that depended upon the rigidity of the beam-connections and the connections of one column to another for their lateral strength have been thrown out of plumb by the horizontal wind-pressure. Such a failure was particularly noticeable in a ten-story building erected in New York, which when partially completed was found, after a heavy storm, to be about 10 inches out of the vertical. By the use of the numerous rolled shapes a multiplicity of structural-steel columns have been designed. The principal ones have become standard and are known as the angle column, the Z-bar, the box, the Grey and the Larimer. The usual sections of these columns are shown in Figure 42.

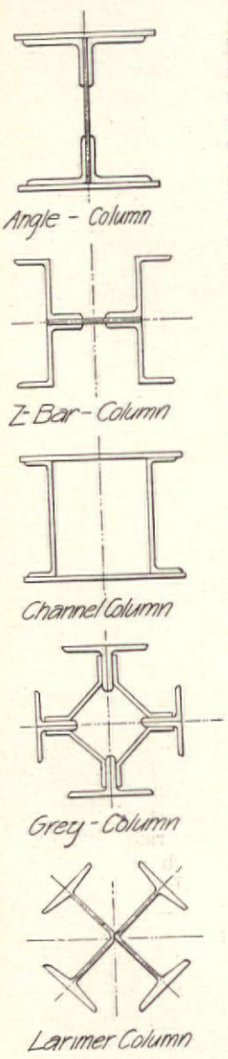


Fig. 42.

Columns under ten diameters in length are liable to fail by crushing, while columns where the ratio between the diameter and the length is greater than this are liable to fail by lateral flexture and crushing at the ends. The strength of the column depends, therefore, upon its length and also upon the distribution of the metal in its section, for where columns have the same area the one in which the metal is distributed farthest from the centre will offer the greatest resistance. The distribution of the metal in the column-section is determined by the radius-of-gyration of the section. If all the metal in a column-section were assembled at a distance from the centre equal to the radius-of-gyration, the column would offer the same resistance to flexure as if the material were distributed throughout the cross-section.

Not only does the strength of a column depend upon its length and radius-of-gyration, but it also depends upon the shape of the ends and the manner in which they are secured. Cast-iron columns in buildings are provided with flat ends only, and one formula will cover all cases which may arise. The formulas for hollow, round and rectangular cast-iron columns with square ends are based upon Gordon's formulas. These formulas may be stated as follows: —

Rule I. — The safe load in tons per square inch that a hollow cylindrical cast-iron column with square ends will support is equal to the quotient obtained by dividing 5 by the sum of 1 and the quotient obtained by dividing the square of the length of the column in inches by 800 times the square of the outside diameter in inches.

Rule II. — The safe load in tons per square inch of section for hollow square cast-iron columns with square ends is equal to the quotient obtained by dividing 5 by the sum of 1 and the quotient of the length of the column in inches, squared, divided by 1,067 times the least diameter squared.

[1] Continued from No. 1371, page 6.

The results of both of these rules are in tons of 2,000 pounds, and provide for a factor-of-safety of 8, when a unit ultimate compressive strength of 80,000 pounds is considered. The rules may be expressed by the following formulas: —

For hollow cyclindrical columns

$$s = \frac{5}{1 + \frac{l^2}{800\,D^2}}$$

For hollow square columns

$$s = \frac{5}{1 + \frac{l^2}{1{,}067\,D^2}}$$

in which s equals the safe unit compressive stress in tons, l equals the length of the columns in inches, and D equals the outside diameter, or the length of the least side in inches.

Where the ultimate strength of cast-iron columns in pounds per square inch of cross-section is desired the following formulas may be used instead of the above: —

For hollow cylindrical columns

$$s = \frac{80{,}000}{1 + \frac{(12\,L)^2}{800\,D^2}}$$

For hollow rectangular columns

$$s = \frac{80{,}000}{1 + \frac{(12\,L)^2}{1{,}067\,D^2}}$$

In these formulas s equals the ultimate unit compressive strength in pounds, L equals the length of the column in feet, and D, as before, equals the outside diameter, or the length of the least side in inches. In application of the above formulas assume the following problem: —

Example. — Required, the safe load for a hollow round cast-iron column 18 feet long and 12 inches in outside diameter, provided the metal is 1 inch thick, and a factor of safety of 8 is desired.

Solution. — The sectional area of the column is equal to $.7854\,D^2 - .7854\,d^2$, or, since D is the outside diameter of the column, and d is the inside diameter of the column, the area equals

$(.7854 \times 12 \times 12) - (.7854 \times 10 \times 10) = 34.55$ square inches.

Having obtained the sectional area, the safe unit compressive stress in tons may be determined by substituting in the formula

$$s = \frac{5}{1 + \frac{l^2}{800\,D^2}}$$

which then becomes: —

$$s = \frac{5}{1 + \frac{216 \times 216}{800 \times 12 \times 12}} = 3.57 \text{ tons.}$$

By multiplying this value by the area, 34.55 square inches, as previously obtained, the entire bearing-capacity of the column is found to be 123.34 tons.

For convenience in determining the safe load any cast-iron column will support, without working out the lengthy formulas described, the following tables have been evolved: these tables

STRENGTH OF HOLLOW CYLINDRICAL AND HOLLOW SQUARE CAST-IRON COLUMNS.

$\frac{L}{D}$	Ultimate unit compressive stress.		$\frac{L}{D}$	Ultimate unit compressive stress.	
	Cylindrical.	Rectangular.		Cylindrical.	Rectangular.
1.0	67,800	70,400	2.5	37,600	43,300
1.1	65,600	68,700	2.6	36,000	41,800
1.2	63,500	66,900	2.7	34,500	40,300
1.3	61,300	65,100	2.8	33,100	38,800
1.4	59,100	63,200	2.9	31,800	37,400
1.5	56,900	61,300	3.0	30,500	36,100
1.6	54,700	59,400	3.1	29,300	34,800
1.7	52,600	57,500	3.2	28,100	33,500
1.8	50,500	55,600	3.3	27,000	32,300
1.9	48,400	53,700	3.4	25,900	31,200
2.0	46,500	51,900	3.5	24,900	30,100
2.1	44,500	50,100	3.6	24,000	29,100
2.2	42,700	48,300	3.7	23,000	28,000
2.3	40,900	46,600	3.8	22,200	27,100
2.4	39,200	45,000	3.9	21,400	26,200

NOTE. — The value of L is in feet, while the value of D is in inches.

gives the ultimate strength in pounds per square inch of section for columns having different values of $\frac{L}{D}$, that is, the ratio between the length of the column in feet and the diameter in inches. In order to use this table, first fix upon the factor of safety, and then determine the sectional area of the column. Having found the ratio of $\frac{L}{D}$ for the column under consideration, divide the value in the table by the factor of safety, and multiply this quotient by the sect onal area of the column. For instance, assume that a column is 16 feet in length and 10 inches in diameter. The ratio of $\frac{L}{D}$ is 1.6, and from the table the ultimate strength in pounds per square inch for a hollow cylindrical column having this proportion between the diameter and length is 54,700 pounds. If a factor of safety of 6 is required, the safe bearing-value for each square inch of section will equal 9,116, provided the column is $\frac{3}{4}$-inch metal, this sectional area will equal 21.7948 square inches, and the working-strength of the column will be 9,116 × 21.79, or 198,637 pounds.

The formulas commonly used in figuring the strength of structural-steel columns are the Gordon formula and the straight-line formulas. The Gordon formula is the most complicated, and has been substituted by the straight-line formulas, which appear to give results more nearly agreeing with tests made upon full-sized column-sections.

The columns, as previously stated, may be either hinged flat on the ends or fixed. Hinged columns are those which are connected in a structure by pins, and only occur in bridge and heavy truss work. Flat-ended columns occur frequently in building-construction, in fact are usual where the columns continue from floor to floor, the base of one resting upon the cap of the other.

Columns with fixed ends are principally struts that occur in riveted frame structures, and it is not usual to consider columns where the floor-beams are bolted or riveted to brackets as having fixed ends. The Gordon formulas for the different columns are as follows: —

Hinged ends

$$s = \frac{s_1}{1 + \left(\frac{l^2}{18{,}000\ R^2}\right)}$$

Square ends

$$s = \frac{s_1}{1 + \left(\frac{l^2}{24{,}000\ R^2}\right)}$$

Fixed ends

$$s = \frac{s_1}{1 + \left(\frac{l^2}{36{,}000\ R^2}\right)}$$

In these formulas s equals the ultimate unit compressive stress upon the column-section; s_1 equals the ultimate unit compressive stress of the material (in structural-steel columns generally assumed at from 50,000 to 60,000 pounds), l equals the length of the column in inches, and R equals the least radius-of-gyration, which may be determined by means described in connection with article which appeared in the January 18th issue of the *American Architect*. The results obtained by these formulas will give approximately the ultimate supporting strength of any structural-steel column, per square inch of section, and the value should be divided by the factor of safety,

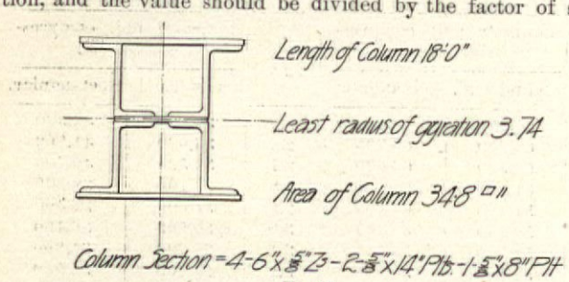


Fig. 43.

from 3 to 5, though commonly taken at about 4. In application of the above formula, assume the following problem: —

Example. — The Z-bar column shown in Figure 43 has a least radius-of-gyration of 3.74 and a length of 18 feet; provided medium steel, with an ultimate compressive strength of 60,000 pounds, is used, what will be the safe load the column will support? The ends of the column are flat.

Solution. — The safe unit compressive strength of the column-section is equal to s, or

$$\frac{60{,}000}{1 + \frac{216 \times 216}{24{,}000 \times 3.74}} = 39{,}474 \text{ pounds.}$$

If a factor of safety of 4 is used the allowable unit stress will equal 39,474 ÷ 4 = 9,868. Since the area of the column in

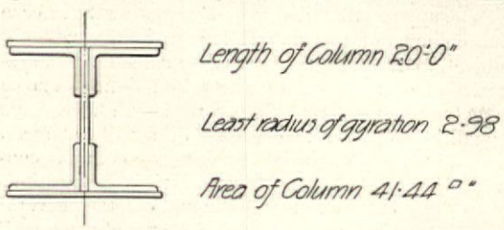


Fig. 44.

Figure 43 equals 34.8 square inches, the allowable working stress on the column will equal 9,868 × 34.8 = 343,406 pounds, answer.

The straight-line formulas (so called because when plotted they will give a straight line) are more convenient and more accurate than the Gordon formulas just given. These formulas are for columns whose lengths are between 50 and 150 radii-of-gyration. The formulas for the several types of columns and for medium and soft steel are as follows: —

MEDIUM STEEL.

Hinged or pin-connected ends, $s = 60{,}000 - 260\frac{l}{R}$

Square or flat ends..... $s = 60{,}000 - 230\frac{l}{R}$

Fixed ends..... $s = 60{,}000 - 210\frac{l}{R}$

SOFT STEEL.

Hinged or pin-connected ends, $s = 54{,}000 - 225\frac{l}{R}$

Square or flat ends..... $s = 54{,}000 - 200\frac{l}{R}$

Fixed ends..... $s = 54{,}000 - 185\frac{l}{R}$

In these formulas l equals the length of the column and R the radius-of-gyration, both values being in inches. In application of the above formulas, assume the following problem: —

Example. — Required, the safe bearing-strength of the angle column shown in Figure 44, when its length is 20 feet, its sectional area 41.44 square inches, and its least radius-of-gyration 2.98, provided the column is built of medium steel, has square or flat ends, and is to have a factor of safety of 5.

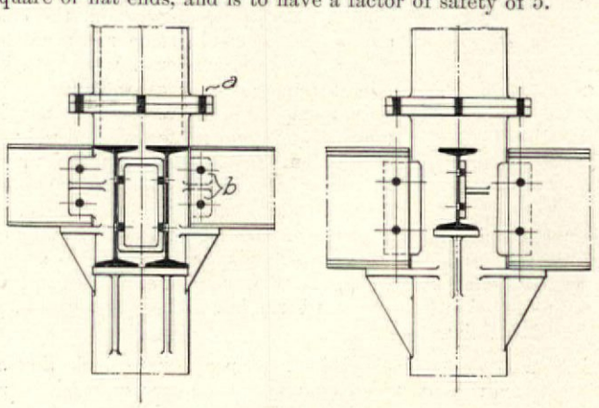
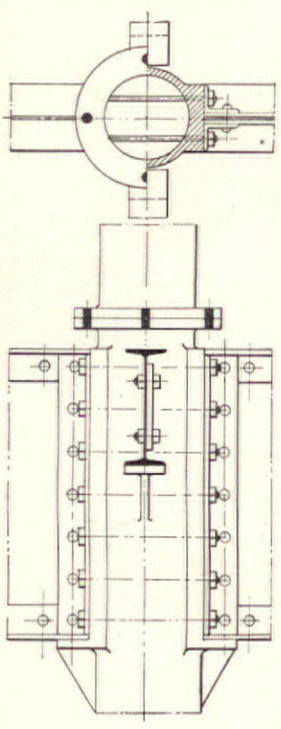


Fig. 45.

Solution. — From the example $l = 240$ and $R = 2.98$; then by substitution in the formula $s = 60{,}000 - 230 \times \frac{240}{2.98}$, or 41,485 pounds per square inch; this divided by 5 gives 8,297 pounds, the allowable compressive stress per inch of area upon the column-section; from the problem the area of the column is 41.44; therefore, the allowable bearing-strength of the column equals 8,297 pounds × 41.44, or 343,827.

Considerable study can well be put upon the design of cast-iron columns, and especially should careful consideration be given to the brackets and connections for securing the floor-girders to the columns. Where the column is cylindrical the general design shown in Figure 45 is usually employed for the supporting brackets and connecting webs of the floor-system.



The upper column is secured to the lower by means of bolts through the flanges, as at *a*, and care should be taken to have these bolts a snug fit, for upon them depends the alignment of the column, and, to a certain extent, its rigidity from floor to floor. Tests made upon brackets cast upon columns show that they usually fail by tearing out an adjacent section of the column shell. For this reason it is found advisable to thicken up the metal in the column shell around the brackets, and especially should large fillets be provided in all corners. The top and bottom surfaces of all cast-iron columns should be faced true, at right angles to the axis of the column, and all columns of a tier should be of uniform length. The holes in the connecting-webs, as at *b b*, are cored, usually $\frac{1}{8}$ inch larger in diameter than the bolt, while the best practice requires the holes drilled, as at *a a*, in the flanges.

Where a plate-girder forms one of the principals of a floor-system the construction shown in Figure 46 is usually employed. Such a connection is very rigid, and furnishes considerable lateral stiffness to the structure. The base of each column should be designed as shown in Figure 47. The bottom flange is usually made from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in thickness. It is not advisable, however, to have it greatly thicker than the shell, for the mass of metal at this point causes undue shrinkage, and is likely to create initial strains. The webs are preferably placed upon the diagonal. The base of the column, as shown, may rest directly upon the capstone of the pier, but it is far preferable to provide a bearing-block of cast-iron, as designated in Figure 48. The advantage obtained by the use of these blocks consists in the fact that they can be erected upon the tops of the piers, and carefully aligned and levelled, forming a reliable and accurate means for setting the columns.

For protection against fire a column with a double shell is often employed, as shown in Figure 49. The interior column sustains the weight of the floor, while the exterior is merely a fireproof protection. This practice is not used to any great extent, as a fireproof covering of terra-cotta or concrete upon expanded-metal is considered fully as reliable, and far less expensive.

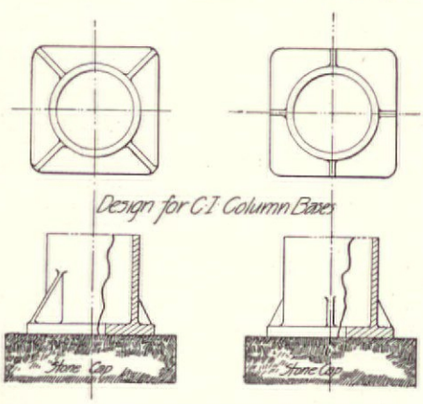


Fig. 47.

In inspecting cast-iron columns at the building it is often necessary to reject some, on account of the unequal thickness of the shell. Where the column is cast in a horizontal position the core is liable to drop, and the metal on one side of the column may be $\frac{3}{8}$ inch thick, while on the other it is $1\frac{1}{8}$ inches, when the uniform thickness of the column should have been $\frac{3}{4}$ inch. This unequal distribution of the metal is likely to cause the failure of the column by side flexure. Blow-holes and cold-shuts, when of sufficient size, will condemn a building column. Unscrupulous foundrymen sometimes cover up such defects with a filler and putty, or Babbitt metal, and such filling when under paint can only be detected with a knife or hammer. In order to determine whether the shell of the column is of uniform thickness $\frac{1}{8}$-inch holes should be drilled through the column on the diameter at right angles to the parting. Through these holes, by means of a piece of bent wire, the thickness on the two sides can readily be ascertained. The shaft of the column should be straight, not deviating more than $\frac{1}{4}$ inch or $\frac{3}{8}$ inch, and it is well for appearance to accept only such castings as are true to pattern, having sharp corners and smooth surfaces.

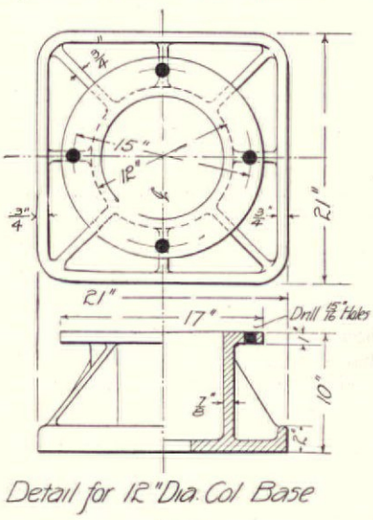


Fig. 48.

Columns in building-construction are often subjected to eccentric loading — that is, where the point of application of the load is without the centre of the column. Such a load exists in outside columns where the heavy weight of the wall on one side is not counterbalanced by the floor load. Provision must be made in the sectional area of the column to take care of this eccentric load. The eccentric load creates a bending-moment in the column, and the bending-moment is equal to the amount of the load multiplied by the distance of its line of action from the centre of the column.

For instance, in Figure 50 the amount of the load upon the bracket to one side of the column is 20,000 pounds, and the distance from its point of application to the centre of the column is 20 inches. In consequence, the bending-moment upon the column equals $20{,}000 \times 20 = 400{,}000$ inch-pounds. The bending-moment due to an eccentric load upon a column, then, is found by the formula $M = W l$, in which W equals the weight or load in pounds, and l the distance from the line of action of the load to the centre of the column. From a previous article it was found that M must equal M_1 — that is, the bending-moment must equal the resisting-moment. Since M_1 equals $\frac{s I}{c}$, $M = M_1 = \frac{s I}{c}$, in which s equals the safe unit fibre-stress, I the moment-of-inertia of the section, and c the least distance of the outside fibres of the section from the neutral axis. The radius of-gyration, or R, is always equal to the square root of $\frac{I}{A}$, or $R^2 = \frac{I}{A}$, in which A equals the entire area of the section. From this formula I must equal $R^2 A$, and the value $R^2 A$ must be substituted for the value of I in the formula $M = M_1 = \frac{s I}{c}$,

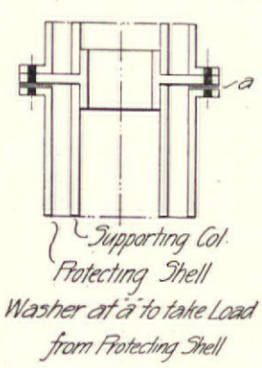


Fig. 49.

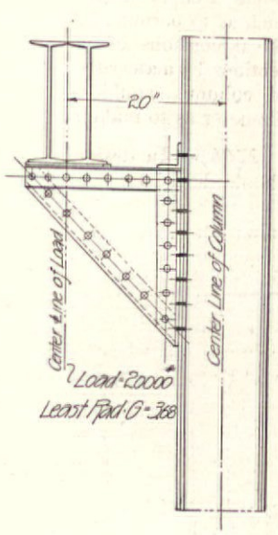


Fig. 50.

so that $M = \frac{s R^2 A}{c}$, or, by transposition, $A = \frac{M c}{s R^2}$. This latter formula gives the area that it is necessary to add to the section of any column in order to resist the bending-stress due to an eccentric load. Upon providing for this increase in area in the

column-section the radius-of-gyration should be carefully figured or determined, to see that it does not vary materially from the value of R^2 used in the formula for determining the additional area required.

In application of this formula, assume the following

Example. — Determine the additional area that it will be necessary to add to the column-section, subject to the conditions of loading described in Figure 50.

Solution. — The bending-moment, as previously explained, equals $W l$, or $M = 20{,}000 \times 20 = 400{,}000$ inch-pounds, and A equals by the formula $\frac{400{,}000 \times 6}{15{,}000 \times 3.68 \times 3.68} = 11.8$ square inches; this being the additional area required in the column-section in order to resist the bending-moment caused by the eccentric load. Provision can be made for this additional load by increasing the weight of the channels, or the thickness of the cover-plates.

Careful consideration should be given by the designer of skeleton-construction to what is the best type of column applicable to the work in hand, and, in deciding, the following points should be carefully reviewed: —

First. — Economy both as regards material and workmanship. The column should be as light as possible consistent with the work that it has to perform, though due regard should be paid to the possibility of corrosion and the ultimate weakening of the column from this effect. The column-section in which the radii-of-gyration upon the two axes are most nearly equal probably offers the most economical section. The riveting throughout the column should be arranged so that it can be readily done by power. The rolled sections should be selected with due regard to stock sizes of rolled shapes, so that no difficulty will be experienced in obtaining the material. Patented sections are subject to the disadvantage, when the supply is located at a distance from the point of erection, of being not readily obtainable, and prompt shipments not always possible.

Second. — The column-section is preferable that allows the floor beams or girders to be connected close to the centre of the column, for by this means dangerous eccentric loads are avoided, and the reactions of the girders or beams are transmitted directly to the centre of the column.

Third. — Simple construction at the connections is preferable. Bent or swaged plates of peculiar shape are objectionable, and, in designing the connection, rigidity in assembling the work should always be borne in mind.

Fourth. — Such a column-section should be designed that the reduction in the sectional area of the columns throughout the several tiers may readily be attained by reducing the sectional area of the rolled-steel shapes. The design should be such as to permit of this reduction without changing materially the dimensions of the column-sections. Should the column-sections be materially changed it is evident that the upper tier of columns would be of such light construction and small diameter as to make adequate beam-connections difficult.

Fifth. — In designing the column-section careful attention should be given to accessibility for inspection and painting. When the fireproofing is complete this consideration is of little importance, as the covering cannot generally be removed to inspect columns, and besides the fireproof covering tends to prevent the accumulation of moisture on the column, and hence lessens the liability of deterioration.

Further data with fegard to the design of structural-steel columns, their beam and girder connections and lateral bracing will be taken up in the next article. M. M. Sloan.

[To be continued.]

A FEW PARIS JOTTINGS.

PROBABLY the man is unknown who having a day, or even a few hours, in Paris *en route* for any place in Europe, or in any part of the wide world, does not find something new to amuse or instruct him. The mere streets are constantly changing, although the shops remain the same, with the same *articles de Paris*, the same photographs, the same colored frivolities. One part of Paris seems to vie with the other, — progress and conservative conventions glide on side by side, as in no other city. Only a year ago, the Exhibition buildings were disappearing, trams were regaining their normal ways, and the débris of the World's Fair was scarcely swept away. Now all is spick and span, and the city is once more a delightful specimen of what a city ought to be.

Many of the buildings of Paris are in bad taste and some are most atrociously ugly; but one and all are made decorative, in forming centres or vistas of streets and squares. There is no haphazard in Paris improvements. When the two new palaces were designed for the Retrospective and Beaux-Arts departments of the Exposition, they were placed on each side of the approach to the new bridge, the Alexandre III. The bridge started from the centre of the Place des Invalides, and the whole design was intended to form an architectural decoration leading up to Bruant's old hospital. It was a fine idea, and the result is beautiful; from the Champs Elysées one looks across the bridge and up the Place to the gilded dome. It is one of the finest vistas one can see anywhere.

The old rooms of the Louvre which used to contain drawings by the masters, faïence, glass and the Sauvageot Collection are now resplendent with painted ceilings, tapestried walls, rich damask curtains and old furniture — all from the Garde Meuble. Many of these treasures were in the Retrospective Exhibition of 1900. Boulle cabinets, the great *gaines* in Rouen-ware, some fire-dogs by Gouthière (a stag and wild boar beautifully chiselled), Oriental vases with Gouthière mounts, a wonderful *commode, tempo Directoire* with *plaques* of Wedgwood framed in the finest metalwork, and various other examples of the periods of Louis XIV, XV, XVI, may be studied in place. A bedstead made by Bennmann from the designs of Philippe de la Salle is a gem of its kind. The whole arrangement is that of the Wallace Collection, each room being arranged as a dwelling-room, with the exception that cords or rails protect the objects from ignorant hands. The walls are decorated with pictures — among others, some pastel portraits by de la Tour.

The collections which used to be in these rooms seem to have been dispersed among the various *musées;* but the drawings have been placed elsewhere, though they are not yet visible to the public.

There is one arrangement at the Louvre of which one may speak with disapprobation. Formerly we were allowed to keep our sticks and umbrellas. During the Exhibition we were compelled to leave them with the custodians, and, like the prices at the restaurants, the disappearance of the Exhibition has not brought one or the other to its normal condition. If the Louvre had but one entrance, like the National Gallery or British Museum, it would not matter; but to be obliged to tramp all round the building to fetch one's umbrella when one has already been round it is hard, and adds much to the fatigue. I cannot see why the *gardiens* could not send the sticks, etc., round to the main entrance where the public might find them. The leaving of our property is not our desire — it is for the good of the museum; therefore I think it very hard to have to leave my umbrella in the Place du Carrousel, and then to be obliged to return there to fetch it, although the end of my promenade may be at the Church of S. Germain l'Auxerrois. It is fatiguing enough to make the tour once; it is most irritating to be obliged to tramp back again the whole distance. S. Beale.

MUNICIPAL SOCIALISM.

THE State Department has published in advance-sheets of the Consular Reports a long report by James Boyle, United States Consul at Liverpool, on "Municipal Socialism in Great Britain." The Consul notes a quiet but gradually increasing development in Great Britain of that phase of socialism known as "municipal trading," or the ownership and operation of public utilities. In 1875, he says, the capital invested in municipal undertakings in Great Britain was $465,000,000, and in 1900 it was $1,500,000,000. He adds:

"There are now in Great Britain 931 municipalities owning waterworks, 99 owning the street-railroads, 240 owning the gasworks, and 181 supplying electricity. Most of these are in England. Municipalities were not allowed to work the tramways until 1896. It is estimated that half of the gas-users in England use municipal gas. In a number of places — Liverpool among them — the municipalities supply electricity for lighting and power, while the gas-supply is still in the hands of private corporations. In the case of Liverpool, the gas-company is quite willing to sell to the municipality, but the latter will not buy: first, because under the charter of the gas-company the municipality would be compelled to pay a perpetual dividend of 10 per cent to the stockholders, and, secondly, because it is believed that in the near future electricity will practically supersede gas as an illuminant.

"The municipalities of Leamington and Harrogate own Turkish-baths, two of the best at present existing in Great Britain, and Harrogate also gives fireworks-displays at municipal cost. Glasgow, like Liverpool, owns its waterworks and trams, and provides municipal lectures. Glasgow has recently reduced the fares on the tramcars, so that there are now not only halfpenny (1 cent) fares, but a distance of two and one-half miles can be travelled for 2 cents. Universal penny (2 cents) fares will probably shortly be introduced in Liverpool. The "transfer" system, as prevailing in America, is not used in Liverpool, nor in any other British municipality, so far as I know. Glasgow was the first city to establish a "municipal palace." Manchester owns shares in its ship-canal. Out of its municipal-tramway profits, Sheffield has appropriated $75,000 for the erection of shops and business-premises which it will rent. Quite recently the northern townships outside of London bought the well-known Alexandra Palace, where the municipal authorities maintain an auditorium and give

organ-recitals and theatrical, military-band, and variety entertainments of all sorts, and industrial exhibitions. Torquay owns a rabbit-warren; Colchester possesses an oyster-fishery; St. Helen's (a chemical centre in this consular district) supplies sterilized milk; Hull owns a crematorium: Doncaster and Chester own racecourses (the former actually managing the races); Bournemouth owns one of the finest golf-courses in Great Britain; West Ham, a borough of London, owns a stone-flag factory; and Bradford owns a hotel — as does also Liverpool (on its waterworks property in Wales). Bristol has municipalized its docks and harbor, at a cost of between $10,000,000 and $15,000,000.

"The docks of Liverpool are municipalized in a modified way. The system is peculiar to Liverpool. This vast estate, valued at several hundreds of millions of dollars, is administered by a public trust, nearly all the members of which are elected by those who pay dock-dues, and the profits, after deducting expenses and payment of interest on capital account, go to improvement, and not to the benefit of a private corporation. The probability is that the London docks will before many years be managed under either the Bristol or the Liverpool plan. Nottingham, in addition to owning parks, markets, artisan dwellings, baths and a hospital, has bought a castle and a forest, and has a natural-history museum and a school-of-art, and was the first municipality in Great Britain to have a university college. The last item gives occasion for the statement that several English cities have within the last year or so taken up the question of local universities. Birmingham has established one, and Liverpool will shortly follow suit.

"Liverpool is one of the foremost cities in municipal socialism. It owns the waterworks (one of the best systems in the world); it operates the street-cars; it supplies the electric light and power; it has one of the largest and best public-bath systems anywhere, and proposes to erect the finest Turkish-bath in Europe; it provides public laundries for the poor districts; it furnishes flowers and plants for the windows in the slums; it sells sterilized humanized milk for the children of the poor at cost price; it has a salaried organist to play its famous municipal organ; it gives municipal lectures — and all these in addition to the usual undertakings of municipalities, such as parks with concerts, technical schools, etc. But the greatest socialistic undertaking by the Liverpool municipality is that of providing dwellings for the very poor, the dispossessed tenants of demolished unsanitary dwellings of the slums.

"The one great predominating question in connection with municipal socialism is the 'housing question' — that is, the demolition of 'slums' and unsanitary dwellings and the erection by the municipality of suitable dwellings in place thereof. Americans who have never been here can have but little conception of the terrible conditions existing in many of the large cities of Great Britain as to the housing of the very poor. This condition is a heritage of former social and economic conditions, as well as of feudal land-laws, and of the past indifference both of the municipalities and of Parliament, as well as of the public generally — even, it may be said, of philanthropists. But heroic efforts are now being made in many of the large cities, and Liverpool is in the front rank in the efforts to remedy this deplorable state of affairs. Many difficulties have been confronted and overcome which at first were thought to be insurmountable — and these in addition to the perplexing moral and social questions involved. . . .

"The Liverpool municipal dwellings are mostly in the form of blocks of tenement-houses, or 'flats,' three or four stories high. The Local Government Board (a bureau directly under the control of Parliament) insists upon certain provisions to meet the necessity of dispossessed tenants before sanctioning demolition operations. Until 1899, there had been a conspicuous failure to meet this obligation, but since then the wants of dispossessed persons have been carefully foreseen and met. The present policy is to have blocks of dwellings ready within convenient distance, into which dispossessed tenants can go immediately they remove from the condemned property. Most of these tenants are dock-laborers or a like class. It is claimed that Liverpool alone among the municipalities of England and Scotland has been successful in supplying a type of building within the financial means of the poorest of the poor. A single room can be had for as low as 45 cents a week. The rent of two rooms ranges from 60 to 80 cents; that of three rooms, from $1 to $1.10; that of four rooms (the largest suites provided), from $1.25 to $1.50. The fixtures are simple, but superior to those supplied in like dwellings by private landlords. In a few dwellings, hot water is supplied. Others have gas, paid for on the 'slot' principle. Two cents' worth is sufficient for four or five hours' consumption by one burner. Since Liverpool went into this enterprise, it has paid $1,925,000 for demolished property, and, in addition, several pieces of land have been purchased, costing $335,825, for the erection of municipal dwellings. The cost up to date for construction alone has been $732,875. The total burden on the local taxation as the result of these combined operations amounts to 1¾*d.* in the pound sterling, or 3½ cents on every $4.86. The rents paid are insufficient by about 2 per cent to meet the cost of the dwellings, without counting anything for a sinking-fund, depreciation, etc. The present effort of Liverpool is to provide housing for the dispossessed tenants of condemned slums. It will probably take 12 years to complete this task. Then, the question of providing better accommodations for artisans and mechanics will possibly be faced. Liverpool, it is said, owns more revenue-producing real-estate than any other municipality in the world, its income from this source being about half a million dollars a year.

"The London County Council has within a recent period taken hold of this 'housing question' with a firm and comprehensive grip. There will not be as much compensation paid to owners of slum property as formerly. One scheme adopted by the London County Council provides cottages for 8,000 people; another (and this is on an estate outside of the London boundary-line) will accommodate 6,000 people; and a site has been bought where 42,000 are to be accommodated in pretty little cottages, with gardens. London undertakes to provide for the artisan class as well as for the 'casual,' and in that particular it is in advance of Liverpool. . . .

"The claim is made that the best-governed towns in Great Britain and the towns that have the least taxes are those where municipal socialism prevails. But this claim is strongly controverted, especially as to ultimate results; and the opponents of municipal socialism charge against that system a tendency to extravagance, jobbery, official indifference and lethargy, and the broader charge is made that the system contracts and paralyzes individual effort and enterprise. Yet it should be kept in mind, in connection with this criticism, that municipal socialism has in some cases been embarked upon almost out of necessity — as, for instance, in the case of the housing of the poor in Liverpool, where private enterprise has not only failed absolutely to solve the problem, but has not even alleviated its most crying evils."

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

NO. 409 COMMONWEALTH AVE., BOSTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

ENTRANCE-PORCH TO THE SAME.

FIRST BAPTIST CHURCH, ARLINGTON, MASS. MR. C. B. DUNHAM, ARCHITECT, BOSTON, MASS.

[The following named illustration may be found by reference to our advertising pages.]

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: THE PROPYLÆA, FROM THE SUNKEN GARDEN. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.; — PERGOLA. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE REGISTRATION OF ARCHITECTS IN NEW JERSEY.

JERSEY CITY, N. J., May 22, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs: — I have been requested by the New Jersey State Board of Architects to send you a copy of the enclosed notice which has been published, requesting all architects to register under the law recently passed. Yours truly,

HUGH ROBERTS,
Secretary and Treasurer, State Board of Architects.

STATE OF NEW JERSEY. — STATE BOARD OF ARCHITECTS,
1 Exchange Place, Jersey City, N. J.

Charles P. Baldwin, *President;* Hugh Roberts, *Secretary and Treasurer;*
Arnold H. Moses, Charles Edwards, David B. Provoost.

JERSEY CITY, N. J., May 19, 1902.

NOTICE is hereby given to all architects practising the profession of architecture in the State of New Jersey as defined in "An Act to Regulate the Practice of Architecture" (approved March 24, 1902), and in effect July 1, 1902, that they should now apply for a certificate to practise architecture under Sections 9 and 10 of said law.

For the information of those who desire to secure certificates the Act has been printed in full by the State Board of Architects, and copies will be furnished on application, together with a form with affidavit attached that has been approved by the Board.

The privilege extended to practising architects by Sections 9 and 10 of said law will expire July 1, 1902, after which another form of application for examination under the provisions of the Act will be furnished when requested.

All certificates issued on the present form of application and affidavit will be forwarded to the applicant after the payment of the registration fee of $5.00, said amount being payable after notice of acceptance of application is received by the applicant from the Secretary. All certificates issued are subject to the powers of revocation vested in the Board by the above-mentioned Act. HUGH ROBERTS, *Secretary.*

NOTES AND CLIPPINGS

Repairing a Range-boiler. — A correspondent of the *Metal Worker* gives the following account of a method of repairing a range-boiler resorted to by a man who did not wish to incur the outlay for a new boiler when the old one had begun to leak. The boiler was made of galvanized-iron and the shell was too thin to permit of the use of a drift-punch to make an opening to be tapped so as to be stopped by means of a screw-plug. In the first place, as the owner was somewhat handy, he emptied the boiler and soldered up the hole, but this did not last more than a few days after the boiler became hot, and it began to leak again. He then employed a plumber to fix up the boiler so that it would stand until he could afford to have the old boiler replaced by a new one. The plumber removed the old solder and cleaned off the boiler, making a perfectly round hole, where it leaked, large enough to take a ¼-inch bolt with a soft-copper washer on the inside. The bolt and the washer were secured together and dropped into the boiler through the hot-water opening at the top, a piece of thread being tied to each end of the bolt. It was a simple matter to insert a wire through the hole and catch the thread upon the lower end of the bolt. The bolt was then drawn through the hole and another soft-copper washer placed on the outside. A cement composed of litharge and glycerine was worked into the hole between the inside of the boiler-shell and the washer. Some of the same cement was put on the outside of the boiler-shell under the washer. When enough cement was put on the washers were drawn up tight against the shell by the tightening of the nut. When the cement had hardened it not only made a perfectly tight job, but also one that has stood for a considerable time. This method has been found serviceable for stopping holes in iron tanks, pipes and other places, where replacing the material would have caused considerable expense. It has proved its efficiency where the material is not thick enough to be drilled and tapped to be filled with a plug. The same method can be adopted for stopping sand-holes in thin castings.

This is the man for whom it was planned,
And this is the scamp who put it in hand,
And filled-in the footings with stones and sand,
With no cement, and said, "It's grand!"
When building the house that Jerry built.

These are the bricks, as soft as cheese,
That broke in two if you chanced to sneeze;
Said Jerry: "The man what don't like these,
Lor', blow me! he *will* be 'ard to please;
They'll last for months — unless there's a breeze,"
In the beautiful house that Jerry built.

These are the windows of packing-case wood.
Said Jerry: "Of course it's understood
It'll be extra for windows of real wood;
These 'ere are special, and much too good"
To go in the house that Jerry built.

This is the rubbish that blocked up the drain.
Said Jerry: "Now don't you labor in vain;
Fill it in — it'll never be seen again,
It's ten to one he won't complain;
The cellar is meant to collect the rain"
That falls on the house that Jerry built.

This is the elegant panelled door,
With the natural finish left by the saw,
Which warped till its panels fell out on the floor.
He bought it for six shillings — but, "Lor'!"
Said Jerry, "it looks worth ten bob more" —
Too good for the house that Jerry built.

These are the slates — some small, some great,
Most were crooked, but a few were straight,
Each kept in place by the next one's weight;
Said Jerry, instructively, to his mate:
"I saves my nails and I trusts to Fate,"
When building the house that Jerry built.

These are the locks he bought for a song,
They work three times and then go wrong.
He said: "It's lucky they ain't too strong;
There'll be some repairs a-coming along"
To be done to the house that Jerry built.

This is the price the purchaser paid
(He'd made some cash in the grocery trade);
"Dirt cheap," said the man of trowel and spade,
As the cheque in his horny hand was laid;
"And a better house has never been made"
For the price of the house that Jerry built.

This is the band that came up the road;
The drummer drummed and the cornet blowed,
And as it passed, the house like a flash
Fell suddenly down with a fearful crash,
And all that remained was a heap of smash;
And the owner said words like "blow" and "dash,"
And he stared in amaze at the heap of dust,
While the more he stared the more he cussed
At the vanished house that Jerry built.

A. E. F. in "Property."

The Island of Philæ and the Assuan Dam. — As usual, a number of interesting facts are to be gleaned from Lord Cromer's annual report of Egyptian affairs. He devotes a considerable amount of space to a description of the precautions which have been taken to preserve the foundations of the ruined temples on the island of Philæ, which will be submerged annually when the reservoir at Assuan is completed. He says that the Egyptian Government has been attacked by the engineers for paying too much attention to the artists and archæologists, and by the latter for paying too much attention to the engineers. His own opinion is that to have deprived the people of Egypt on artistic and archæological grounds of the enormous benefits which they will derive from the construction of the Assuan dam would have been perfectly unjustifiable. On the other hand, he declares that everything possible has been done to meet the wishes of those who represent the archæological and artistic aspects of the question. — *N. Y. Evening Post.*

The Invalidity of unsealed Corporate Contracts. — We have repeatedly pointed out the risks which architects, engineers and contractors accept when they make arrangements with corporations and other local bodies without taking the precaution to have the agreements stamped with the common seal in each case. There is so much confidence in a public authority that individual security is neglected. Recently another instance of what we may call the fatality came before the Courts. Mr. Lawford, a civil-engineer, who is known in connection with drainage work, sought to recover £169 14*s.*, remuneration for preparing a report and plans for a scheme of sewerage which the Billericay Rural District Council were about to undertake. The Local Government Board held an inquiry and approved of the plans and estimates. Tenders were sent in, but one was not accepted. It was not denied by the defendants that Mr. Lawford's work was duly performed, or, in other words, there was no defence except the fact that as the common seal was not affixed to the agreement, it was therefore of no value. It is always a disagreeable duty for a judge to be compelled to give a decision when he knows that by it gross injustice must be done to a plaintiff. But so long as the judgment which was given by Lord Denman in Church *vs.* Imperial Gas Company is unreversed there is only one course open, and that is to say that an agreement is illegal which is without a common seal. Lord Denman's words should be remembered as a warning by all who have business with corporations of all kinds, for he said: "The general rule of law is that a corporation contracts under its common seal; as a general rule it is only in that way that a corporation can express its will or do any act. That general rule, however, has from the earliest traceable periods been subject to exceptions, the decisions as to which furnish the principle on which they have been established, and are instances illustrating its application, but are not to be taken as so prescribing in terms the exact limit that a merely circumstantial difference is to exclude from the exception. This principle appears to be convenience amounting almost to necessity. Wherever to hold the rule applicable would occasion very great inconvenience, or tend to defeat the very object for which the corporation was created, the exception has prevailed; hence the retainer by parole of an inferior servant, the doing of acts very frequently recurring or too insignificant to be worth the trouble of affixing the common seal, are established exceptions; on the same principle stands the power of accepting bills of exchange and issuing promissory notes by companies incorporated for the purposes of trade, with the rights and liabilities consequent thereon." In Hunt *vs.* Wimbledon Local Board the architect's plans were utilized, but although the Board had benefited by them the claim for payment was rejected on the ground of informality. How such a defence can be set up by an English authority is beyond comprehension, but the fact remains that payment can be successfully evaded by the absence of a seal. — *The Architect.*

The widest Streets. — In the *Clay Worker* Mr. W. C. Dodge says that Washington, D. C., has sixteen streets, or avenues, each 160 feet wide, and many others 120 and 130 feet in width. Fifty-four per cent of the entire area of the National Capital is occupied by its streets, avenues and alleys, a larger proportion than that of any other city in the world. The street-area of a few of the principal cities is given as follows: —

Washington, D. C.	54 per cent.
Vienna	35 per cent.
New York City	35 per cent.
Philadelphia, Pa.	29 per cent.
Boston, Mass.	26 per cent.
Berlin	26 per cent.
Paris	25 per cent.

Puvis de Chavannes as a Caricaturist. — The lighter side of a great artist's genius is frequently disclosed only after his death. This was the case with the mural painter Puvis de Chavannes, who is remembered for the grave beauty of his decorations in various French cities and in Boston; it is only recently that his minor studies and caricatures have been exhibited in Paris. Apropos of this exhibition *Figaro* recalls an interesting anecdote. The art-critic Count Delaborde, shortly after his election to the Academy of Fine-Arts, took occasion to say of Puvis that "his talent represented the negation of all the essential principles of art." This comment Puvis remembered until Delaborde, now become Perpetual Secretary of the Academy, in a public address perpetrated the ineptitude of declaring that in the entire production of all the centuries he recognized only one work which really deserved the title of masterpiece — namely, the Parthenon. This dictum was the occasion of a caricature by Puvis, entitled "The Ruins of M. Delaborde, drawn from the life by M. Parthenon." Amid the ruins of the dome of the Institute sat the eminent Perpetual Secretary, as a mutilated statue. The face, however, was intact, the head highly polished, and — most notable trait of all — the eyes tightly closed. Below, one read the name of the artist: "To M. Delaborde, gratefully and respectfully, M. Parthenon." — *N. Y. Evening Post.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, JUNE 7, 1902 No. 1380

CONTENTS

SUMMARY: —
The New Director of the Boston Museum of Fine-Arts. — The Baltimore Art Commission protects the Battle Monument of that City. — Failure of a Grain-elevator of Concrete Cylinders. — Burning of an All-Steel Grain-elevator. — Death of James Brown Lord, Architect. — Death of J. J. Benjamin-Constant, Painter. — Operations of the Art Students' League of New York. — The Proposed Charles River Dam and its Effect on Boston Harbor. 73
JOURNAL SKETCHES IN CHINA. — V: CANTON. 75
NEW JERSEY ARCHITECTS' LICENSE LAW. 78
ILLUSTRATIONS: —
The National Bank of Commerce Building, St. Louis, Mo. — Design for the Albany Chambers, Albany, N. Y. — Birmingham University, Birmingham, Eng.
Design for New Organ-gallery and Case in the Chapel, Haileybury College, Eng. 79
COMMUNICATION: —
The Insurance Engineering Experiment-Station. 80
NOTES AND CLIPPINGS. 80

IT would take a very strong and nearly unanimous appeal from our subscribers to induce us to continue the form of publication which, during the current quarter, has been given experimentally to our International Edition. We are not satisfied with the practical working of the new method, which seemed to have the promise of many desirable possibilities in its favor, and believe that no mistake will be made in returning at the earliest practicable moment to the original form of publication. From the first issue for July, therefore, subscribers to the International Edition will again receive their copy in its familiar blue-covered weekly form.

ARCHITECTS, to many of whom Mr. Edward Robinson is personally known, will be pleased to hear of his unanimous election as Director of the Boston Museum of Fine-Arts, in place of General Charles G. Loring, who, after holding that position since the organization of the Museum, recently resigned it. Mr. Robinson has long been reputed one of the best American authorities on classical antiquities, which he has studied for many years. After his graduation from Harvard University he spent five years in Europe, much of the time in Greece, and, on his return, was appointed Curator of Classical Antiquities in the Boston Art Museum. This office he has held ever since, but he has, in the meantime, been employed to assist in the formation of collections of casts and other objects for various institutions, making several trips to Europe for the purpose, and has published several essays of great interest on his favorite topics. Personally, Mr. Robinson is peculiarly fitted for a position which demands, not only industry and learning, but great patience and tact in dealing with the perplexing problems incident to the management of a great semi-public institution, and his friends, and the community in general, will join in the hope that he may be spared to occupy it for many years.

THE Baltimore Art Commission has distinguished itself by arresting in the bud the operations of the Superintendent of Public Buildings, who had men at work "chiselling off" the dirt on the faces of the figures on the Battle Monument. The Monument was certainly dirty, and the Superintendent, who seems to be a friend of neatness, if not a very discriminating one, gave authority to a person to "clean" it. The latter is said to have begun his work by applying a strong acid to the marble, and, as this does not seem to have worked rapidly enough, he followed it up with a chisel. Fortunately, some one saw what was being done, and reported it to the Art Commission, which immediately applied to the Mayor to have the work stopped; and the Mayor readily complied with the request, at the same time appointing a committee of the Commission to investigate the matter, and make recommendations. The Committee, which included two architects, discovered that some of the reliefs on the Monument had been nearly destroyed by successive cleanings of the same kind. As the members picked up fragments of marble around the Monument, which had been knocked off by the zeal of the cleaners, it may be imagined that their prediction, that a few more years of such treatment would ruin the artistic beauty of the structure, was fully justified, and their recommendation, that, for the future, the cleansing of marble sculpture belonging to the city should be limited to the application of water with sponges or bristle brushes, will, we hope, be kept in mind, not only in Baltimore, but elsewhere.

AS it is unquestionable that the Baltimore Monument, after eighty years of existence, had become very black, and as marble sculpture streaked with black and brown is not so attractive as new work, it is worth while to consider whether, under the conditions which necessarily prevail in large modern cities, the placing of marble statues out of doors is not a mistake. In Washington, perhaps alone among the principal American cities, marble sculpture has been able to resist nearly a hundred years of weathering without great injury, but, elsewhere, bronze seems to be the only successful material for municipal decoration. In Paris, the local limestone takes, with age, a brown color which is not unpleasant, and it is possible that some of our limestones or marbles might weather in a similar way; but those which have hitherto been used seem to resemble the London stone in assuming a dingy, disreputable color. Fortunately, none of the stones used here for sculpture are subject to the mangy cutaneous disease characteristic of the London work; but there is room for a great deal of discrimination in the choice of material. Undoubtedly, our granites might be used with advantage, so far as durability is concerned; and some of the milky white granites, as well as the black and red Maine granites, would lend themselves to artistic effects.

TWO accidents to grain-elevators have taken place within a few days, each of which teaches an interesting and important lesson. In one case, the Peavey Grain Company, of Duluth, with an intelligent enterprise which cannot be too highly commended, had sent men to the Danube Provinces, to study the small grain-elevators in use there, made of concrete. On their return, plans were made for an elevator of the same sort, but on a much larger scale. We are told that the plans were "carefully studied," but, judging from the newspaper accounts, it seems impossible that any competent architect or engineer could have been concerned in preparing them, or with the supervision of their execution. In general, the structure consisted of a number of cylindrical bins, each one hundred and four feet high, standing three feet apart. We are not told the diameter of the bins, but only that they were of concrete, strengthened by "steel tie-rods one and one-half inch wide," spaced eight inches apart the whole height of the bin. The thickness of the tie-rods is not given, but they seem to have been mere bands, and the intelligence with which the dimensions and the spacing were made the same at the top of the bin, where the lateral pressure was nothing, as at the bottom, where it amounted to many tons, seems to have directed also the mixing and laying of the concrete work, which was carried up at the rate of thirty inches a day, the whole being completed in eighty-six days. In order to utilize all the space, short walls of concrete were made, connecting the nearest points of the circular bins, thus forming bins with concave sides. A few days ago, the building was tested, by filling one of these concave-sided bins with wheat. Dry grain of this sort exerts a lateral pressure very similar to that of a column of water, so that the lateral pressure at the bottom of a bin one hundred and four feet high would not be far from fifty pounds to the square inch. Supposing the circular bins to have been ten feet in diameter, and one of them to have been filled, the lateral pressure on a section at the bottom, eight inches in height, would be about seventy-two tons. As concrete, particularly concrete made so rapidly as this seems to have been, has very little tensile strength, the designer of the structure seems to have depended, for resisting this enormous strain, on a little steel hoop, an inch and a half wide. Calculated with reasonable prudence, the lowest hoop should have been about four inches wide, and an inch thick, the strength required diminishing from this point to the top; and the joinings would have demanded double fish-plates, and many large rivets. Even then, the tie-rings could not resist a pressure from the outside, which would bend them inward, without calling their

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

tensile strength into play; yet it was just this strain to which the very inadequate hoops actually used were first subjected, by filling, at the test, one of the concave-sided bins with grain, without providing a counteracting pressure by previously filling the cylindrical bins around it. It is not surprising to read that the bin had hardly been filled to the top when it burst, carrying away with it the empty bins around it, and opening in the side of the building, according to the newspapers, a hole sixty-five feet high and fifty feet wide. The owners, with true American courage and persistency, have, as we are told, determined to make repairs, and try another test, believing that the principle of construction is a good one, and that errors of detail were the source of the trouble. In both these points we heartily agree with them. With proper ties, the cylindrical concrete bins should be very durable, and perfectly fireproof, and the concave-sided spaces between can be safely used for storage of grain, if the surrounding circular bins are full, but not otherwise. Of course, it is easy to provide for having the concave-sided bins always filled last, and emptied first; and, with greater knowledge, the system is likely to come into extended and successful use.

THE other grain-elevator mishap affords a good illustration of the ignorance which prevails in the community in regard to the requirements of a fireproof building. A grain-elevator was built, not long ago, by the Canadian Pacific Railroad, which was intended, we are told, to be "absolutely fireproof." The main building was of steel, "heavily constructed," steel being known to be a heavy material, and the floors were of steel plates. There was no wood in the building, "except four cleaning-machines and two elevator-legs," but it was so full of dust and chaff that, when fire started in it, the steel is said to have been actually melted by the intensity of the heat. With such material to feed a fire, a better construction to secure speedy ruin could hardly have been devised. The steel seems to have been exposed everywhere, and the steel-plate floors, of course, curled up as soon as they felt the heat, allowing the flames to run up freely through the building, which formed simply an enormous blast-furnace, as long as the fuel lasted. Spruce boards would have been better than steel plates for floors in such a building. At least, they would keep the fire back until they were burnt through, while metal begins to curl long before it reaches a red heat. *Fire and Water* says, mournfully, that the total destruction of this building has "taken everybody by surprise." It certainly has not taken any architect by surprise, and the people who, like *Fire and Water*, are in search of the "absolutely fireproof building" can easily obtain, by applying to any architect, information which will, at least, prevent them in future from attributing fireproof qualities to any structure of exposed steel used for operations which produce inflammable dust and residues.

MR. JAMES BROWN LORD, one of the most brilliant of the New York architects, died a few days ago after a long illness. Mr. Lord was of distinguished family, his grandfather having been a famous lawyer, while his mother was a daughter of James Brown, the founder of the banking-house of Brown Brothers. He graduated at Princeton University in 1879, and immediately began the study of architecture, under William A. Potter. On beginning practice on his own account he found ready employment, and designed many public and private buildings, including the two Delmonico buildings; the White Plains Insane Asylum; the Babies' Hospital, and the new and magnificent Appellate Court-house, in Madison Square. This beautiful building, of which we have published many illustrations, deserves to rank among the notable works of American architecture yet produced, and we trust that its brilliant and lamented author may be worthily commemorated in it.

JEAN JOSEPH BENJAMIN CONSTANT, one of the most famous of modern painters, died in Paris a few days ago, at the age of fifty-seven. Benjamin-Constant, as he was always called, received his early education in the South of France, and entered the Paris School of Fine-Arts with a high reputation from the preparatory school at Toulouse. He went through the usual routine in Paris, under Cabanel, and was twice "logiste" for the Prize of Rome, but, before his third trial, he came across the works of Fortuny, and, seized with the desire of becoming a colorist of the Fortuny sort, he left Paris, and, soon after, went to Turkey, as an attaché of the French Embassy at Constantinople. Here and in Egypt he studied Oriental color to his heart's content, and his most popular pictures have been of Oriental subjects. Of late years, he had been almost continually engaged in painting portraits, many of them of Americans, and he made several visits to this country in fulfilment of engagements for this purpose. Although not the most sympathetic of French painters, his work was always solid and inspiring, with a certain nobility of character which found quick appreciation among Americans, who, whatever may be said of their ignorance of the details of art, are very sensitive to its higher qualities.

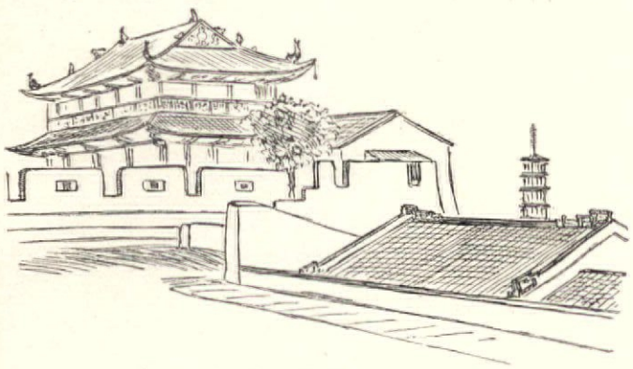
THE Art Students' League of New York offers four prizes for the best work done in the schools of the League during the winter term, and the award for the term now concluded has just been made. The prize in sculpture, of one hundred dollars, given by a member of the League, was awarded to Miss Abastenia Eberle, a second recompense, consisting of a year's free tuition in the classes of the League, being gained by Mr. John Burdick; while two honorable mentions were given. In design, a prize of fifty dollars, offered by Mr. William T. Evans, was awarded to Mr. Wallace Fahnestock; and a similar prize, for the best architectural composition, was carried off by Mr. George F. Of, Jr. The Summer School of the League begins June 1, continuing through June, July, August and September, with daily classes in drawing and painting from the life or the antique, four hours daily; still-life work in any medium; and instruction in practical book-illustration. Every Saturday morning a sketch class, with costume models, is open free to students of other classes, and to special students for a fee of three dollars for the first month, and two dollars a month thereafter. For the regular daily courses the fee is seven dollars for a single month, or five dollars per month for two, three or four months. It is hardly necessary to say that the instruction given in all the League classes is of the highest order, and students find there the invaluable encouragement and stimulus of a great school of art which now has nearly a thousand members.

THE question of building a dam across Charles River, at Boston, so as to form a basin, always full of water, extending from the city water-front to Watertown and Newton, in place of the present tidal stream, pleasant to look at when the tide is high, but filthy and disgusting at low water, is still under discussion, and some interesting points have been brought out. The main objection to the construction of the dam has always been that the checking of the tidal flow might injure the harbor below by interfering with the scouring action of the current in the channel; but this objection has been answered by a communication from Professor Davis, of Harvard University, who, speaking as a geologist, points out that the channel of Boston Harbor was never due, as the engineers of forty years ago imagined, to the erosion of the waters of Charles River, but was formed, probably by glacial action, when the present harbor bottom was above the level of the sea; and that the subsidence of the land, which followed in many places the recession of the ice, carried the surface down without change, the valleys among the glacial moraines forming the channels of the harbor of to-day. Although the Charles River undoubtedly availed itself of the outlet afforded by the new channels, it did not form them, but, on the contrary, brought down, as it still continues to do, mud and silt to fill them up; and the tidal currents, which in some cases, as Professor Davis says, run swiftly enough through the old channels to keep sediment from accumulating in them, bring to other places enormous quantities of sand. The beaches of Nantasket, Cohasset and Revere were formed in this way, out of sand brought by the tides, probably from islands in the outer harbor, which have now been entirely washed away, and the material of which they were composed deposited at favorable points. The salt marshes of Dorchester and Quincy have had a similar origin, and it would appear that the scouring action of the tides, while it exists in certain places, is, so far as Boston harbor is concerned, very limited, and is liable to variations dependent upon the gradual changes in the configuration of the shore brought about by tidal action of another kind. Whether the damming of the river at its narrowest point, as is proposed, would affect the scouring action, Professor Davis does not, as yet, undertake to say, the evidence available for studying the changes which have taken place in the channel being very meagre; but it is probable that new examinations will be made, and a clear light thrown on this very interesting and important problem.

JOURNAL SKETCHES IN CHINA.[1]—V.

CANTON.

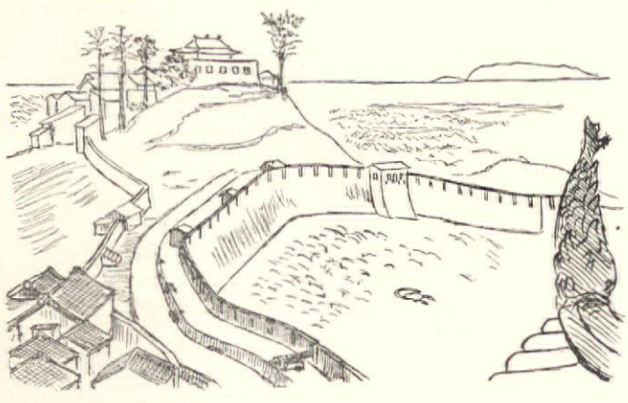
AFTER spending a few interesting hours at this place, Mr. Sampson accompanied me on a trip to one of the city-gates and around the city-walls. In the palanquin, or chair, one sits rather high, as the poles supporting it are attached to the chair nearly two-thirds



View from City Wall, Canton.

from the top, so that one gets a better view than in riding in the Japanese *kago*, which is entirely below the suspending pole, and one is near the ground. The encircling wall of Canton is 20 to 25 feet in height and of great thickness. It is nearly seven miles in length and consists of an immense mass of masonry resting on a sandstone foundation. The top of the wall is reached by steps and also by gently rising inclines. At intervals are gates over which are large building structures. The gates within have a semicircular wall perforated by another gateway. In the days of bows and spears, which the Chinese still retain, these grim walls must have rendered a city almost impregnable, but they offer little resistance to foreign artillery and dynamite. A broad roadway is found on top of the wall which is apparently never used except by loiterers like ourselves, and yet this thoroughfare is wider and cleaner than any avenue I found in the city with its crowded thousands. Such are some of the exasperating perplexities that one encounters in China. In the following sketch of the walls a huge building is shown through which the road passes and below which is one of the city gateways. The building was erected in the fifth century and is leaning slightly. The crest of the wall is pierced for cannon, and, at intervals, were small iron cannon, rusted and utterly neglected. The obsolete and puerile methods of defence explained at once the easy capture of the city by the English and French in the Opium War.

I rode in my chair for a considerable distance and then got out and walked. In the crevices of the wall and in a shady nook the last violets of the season were blooming. Our walk led us to a five-storied pagoda built in the thirteenth century. From the top of this structure a fine view of the city was obtained. It was interesting to look over this vast city where no tall buildings or factory chimney overtopped the uniform low level of the roofs. Here and there were the imposing roofs of Buddhist temples and the many-roofed pagodas rising conspicuously. It is a remarkable sight to have a clear view across a city to the country beyond. The absence of coal-smoke accounted for the clarity of the atmosphere. This condition was markedly so in Tokio twenty years ago and presented an agreeable and startling difference from the smoke-begrimed cities of Europe and America. From the pagoda I made a sketch of the wall which we had just traversed. In the distance is seen a cluster of Buddhist buildings, monasteries and the like. Outside the walls, on

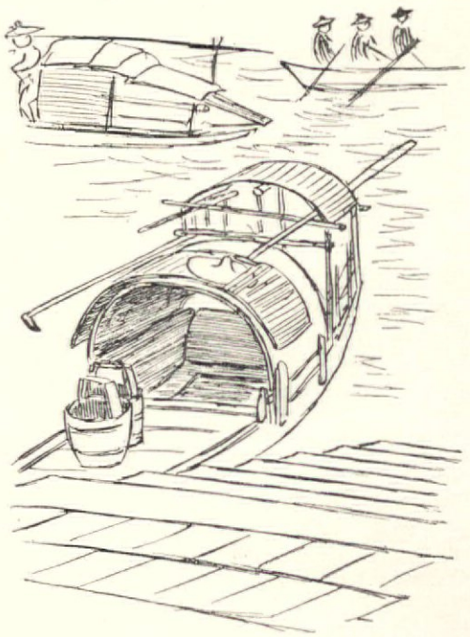


View from five-storied Pagoda, Canton.

a sloping hillside, were thousands of little hummocks of earth, each having a tablet of some sort; here and there an amphitheatre-like structure of stone marked the burial-place of some wealthy mandarin. I examined the region afterwards from the wall and could not find a trace of tree, flower, green leaf or path even. The shocking state of the place, in view of the fact that the Chinese are supposed to worship their ancestors, was in marked contrast to the care and devotion shown by the Japanese, or by our own people, in their burial-places. The ground around the pagoda was covered with a tangled mass of dead leaves and shrubs. Here I found the shells of a large snail, a species which as a boy I had preserved in my cabinet as a rare and valuable object. The ground was strewn with them and a little boy who had observed me collecting them at once gathered a handful and brought them to me, at the same time promptly holding out his hand for pay. A few people were in the enclosure gathering the dead grass and twigs for fuel.

Tired out with the novel and interesting experiences of the day, I reluctantly gave orders to return to the hotel, and again we passed through the same seething mass of people crowding the narrow streets. The night was spent in writing up my notes. My room opened on a platform directly over the banks of the river, and the rear of the hotel came into immediate contact with the Chinese houses. The river was almost as active with traffic as the streets. A continual humming sound with occasional shouts came over the water, and from the region behind the hotel the same eternal din of the various activities was going on, though it was past midnight; this din was now and then punctuated by loud explosions of cannon-crackers, or small cannon, in saluting some high official just returning or departing from his house. With this and the banging of drums and every conceivable form of racket sleep was wellnigh impossible. The streets of an old New England town on the night preceding the Fourth of July are the nearest approach to it, and are a manifestation of the same heedless barbarism.

The manufacturing activities seem to be as lively at night as in



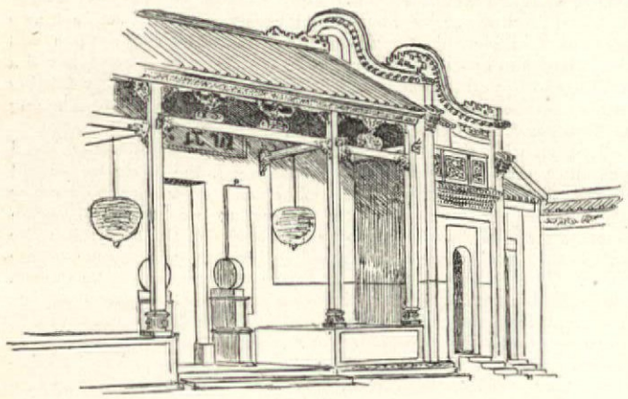
Boats on River, Canton.

the daytime. I walked out back of the hotel at midnight, going through several streets, not daring to go far, however, lest I should be lost. The streets were certainly not so crowded as in the daytime, the shop-doors were closed, but through the crevices glints of light could be seen and the coppersmiths and carpenters and other artisans were apparently just as active as in the daytime, judging from the various sounds that issued from these places. Every one familiar with the appearance of the Chinese laundries in our country will recall the fact that no matter how late one may pass them at night the Chinese are usually found at their occupation. It is said that the Chinese farmer utilizes the moonlight for his work and one can readily believe it.

The next day I visited a Buddhist temple. In general style of architecture, with gateway, huge, carved figures as guards on each side of the entrance, and the various appliances within, the temple followed closely the Japanese type. In the inner court were twenty or more priests chanting at their devotions, with a few curiously-inclined Chinese looking on. Such dreary, dirty-looking priests, shoes, stockings and all, fairly dingy with dirt, presenting a striking contrast to the same class in Japan! The enclosure had evidently never been swept; sticks, dead leaves and noisome pools were everywhere. Back of the temple was a famous flower-garden which was in an equally dilapidated state. There were, however, some interesting evergreens in large flower-pots, which had been artificially trimmed and trained to represent various objects, such as a fan, a kind of fruit, figures, etc. The figure of a man was quite remarkable in its way, though the feet, hands and head were made of some other material. These curious dwarf-trees were in the midst of broken pots, piles of rubbish and festering puddles of water. During my rambles about the grounds I was aware of a new stench commingled with the other vile odors which filled the air, and wondered what

[1] Continued from No. 1378, page 63.

could be its origin. In an enclosure back of the temple were a number of great fat, lazy hogs, and my guide told me they were never killed, but allowed to live and die under the care of the priests of the temple. They were wallowing in their filth, swarming with flies, and spreading over the neighborhood a most horrible stench.



Ceremonial Gateway, Howqua's House, Canton.

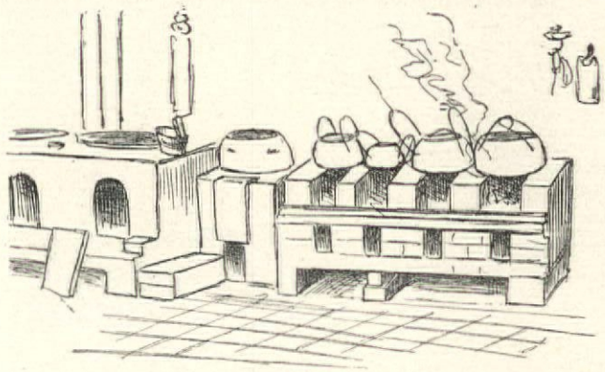
It struck me at the time that here was an emblematical animal that ought to be emblazoned on the Chinese flag beside the imperial dragon. Justice compels me to confess, however, that the hogs were much dirtier than their patrons, though hardly more useless. How many centuries this practice has been kept up I did not learn, but in "*Cleveland's Voyages*" the author records that in 1799 he visited this temple and found several of the priesthood "whose dress bore some resemblance to that of Franciscan friars, and whose business was principally to take care of the sacred hogs. These were about twenty in number and were in an enclosure. They are never killed, but are left to die in the regular course of time; and several of them were so unwieldy that it was not without great difficulty they could move themselves a few feet one way or the other."

With this briefest glimpse of a few temples in two great cities of the Empire I was inclined to believe that Buddhism in China was moribund. I saw no evidence of devotion in the people, no earnest, prayerful attitude as one sees in Japan. The cult apparently excites no religious enthusiasm. What must be expected of a people who, losing their religion, have no science to fall back upon! At night I noticed a Chinese come out of his house, yawning and evidently bored, and burn a little joss-paper before the shrine at his doorway. The burning of paper, incense and lighted tapers seems to be done in the most perfunctory manner. It reminded one of the way in which some people rattle off an unintelligible blessing at home. In all these brief glimpses I could not help contrasting the vigorous and healthy condition of Buddhism in Japan; the fresh-looking temples, though hundreds of years old, so carefully kept and repaired, the surroundings so cleanly swept and in perfect condition, with the utter destitution and decay of the same monuments in China. Here was wrack and ruin everywhere, gnarled roots, by their growth, prying off delicate sculpture from the walls or overturning coping-stones, and no one arresting the destruction.

The few dwellings I had already seen in China were those belonging to the more favored classes, with the exception of the farmhouse near Shanghai. For purposes of comparison it was important to get access to the house of some person of great wealth, and this opportunity was offered me in Canton. By good fortune I got a letter to the family of Howqua — a family of unbounded wealth. The great Howqua was considered one of the richest merchants in Canton. He was known as a person of sterling character and benevolence. In accounts of the Opium War his name often occurs as

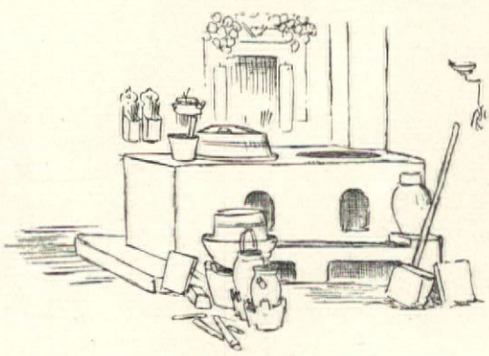
Third Side of Howqua's Kitchen.

mediator. The old Boston and Salem merchants knew him as a man of absolute rectitude, whose word was as good as his bond. He died some years ago, leaving a great fortune to his sons. The house was well known to my guide, who piloted me through the narrow streets to the place. Facing the street was a huge blank wall in which was a single gateway, through which we passed and entered a great square courtyard paved with stone and surrounded on three sides by walls of considerable height, one of which was the wall through which we had passed; the fourth side, which ran at right angles to the street, appeared to be the front of some fine public building, but was in reality a gateway which led to another court and building containing the ancestral tablets upon which were inscribed the names



Kitchen, Howqua's House, Canton.

of Howqua's ancestors. On the anniversaries of the deaths of these various ancestors the head of the family passes through this imposing gateway in the ceremony accompanying the burning of incense and offering prayer. It is only on these occasions that the gateway is used. The accompanying sketch gives only a faint idea of its appearance. The lower portion was composed of fine-grained granite exhibiting the most delicate and beautiful work and finish; the upper portion was of brick; the long, slender columns were monoliths of the same kind of granite; the cross-beams just below the eaves were of wood and at their junction with the stone were elaborately carved; the cornice was richly wrought in intricate designs and was evidently of terra-cotta; the circular drum-shaped discs of the entrance, as well as all the lower portion of the structure, were fine examples of stonework. The whole effect was quite imposing and architecturally very beautiful. The sketch does but slight justice to its stately appearance, though the outlines and proportions are in the main correct. I had made an appointment to meet a grandson of Howqua's, who, with his brother, then occupied the mansion, and so, after making the gateway sketch, I was guided through an alley across a dilapidated garden, then through a gateway to the mansion itself. After waiting some time one of the brothers finally made his appearance and invited me into the house. His brother soon joined us, accompanied by numerous servants and nurses, the latter bearing in their arms diminutive specimens of humanity, the offspring by wives and concubines of these men who had come into the inheritance. The brothers were not particularly gentle in their bearing, and made no effort to relieve me of the pressure of the crowd about me. Every sketch that I made was rudely snatched from my hand by one of the brothers, who disappeared for awhile for the purpose of showing it to the women, who, by etiquette, could not be seen. The contrast in the behavior of these men with that of the Japanese, high and low, was striking. After some time I was invited to sit down and a most delicious cup of tea was brought me. The various rooms through which I was conducted were marvels in the way of elaborate wood-carving and intricate tracery. I found it useless to attempt any sketch of them. The brothers asked me to make the most impossible sketches, which had I attempted would have involved days of the most assiduous labor. When I asked to see the kitchen they were amazed and expressed their rather disgusted astonishment that I should prefer to sketch this region of the house rather than their more elaborate apartments. I was finally conducted to the place and found it quite as dirty and disorderly as any I had seen. Had

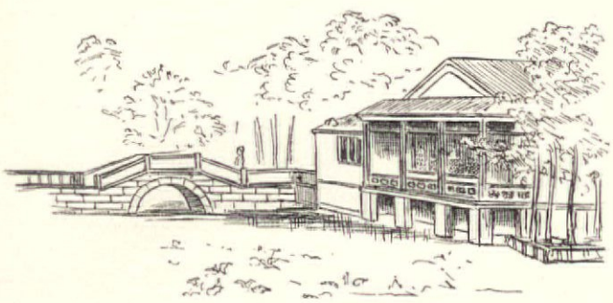


Rice Kettle, Howqua's Kitchen.

the Chinese any realization of what we call dirt, it would be impossible for them to permit a place wherein food for the table was being prepared to be in such a lamentable condition. Filth tracked in from the streets, plus the dirty accumulations that come from their domestic work, made the kitchen a most unsavory place. I cannot but believe that in some of the houses of the richer classes

the apartments must be clean, yet how can we unite such an idea with what has already been seen in the houses thus far described?

Howqua's kitchen was very interesting. I was told that it was a fine example of the old Canton kitchen. It was over one hundred years old and quite different from the kitchens I had already seen, though the differences were probably such as one might see at home

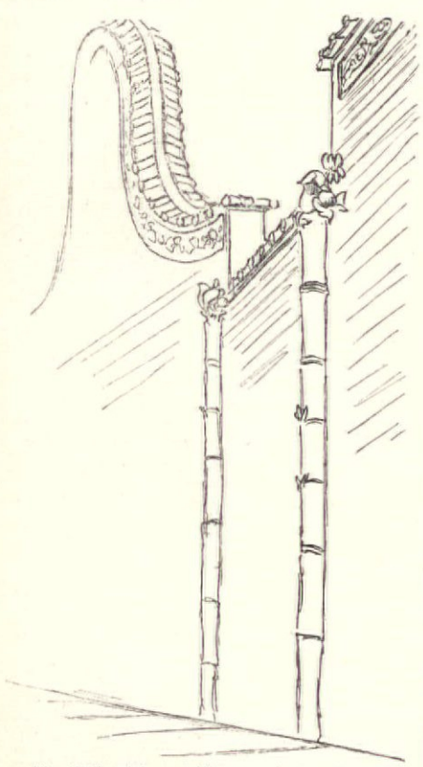


Lotus Pond, Canton.

between the ordinary cast-iron stove and the elaborate range in the kitchen of great houses. Later I saw the interior of a country-house, north of Canton, said to be two hundred years old, and the kitchen was on the same general plan as the one of Howqua's, so I am inclined to believe that the Cantonese affair differs, in many respects, from the northern kitchen, though in both cases, as before remarked, the rice-boilers are very similar. In the drawings three sides of the kitchen are represented. It will be seen that the long range with a number of openings is not unlike the Japanese range, or *kamedo*. The fireplaces are square, and open from top to bottom, and the vessel simply rests on the opening above.

In comparing certain Chinese objects with the Japanese it should be understood that the Japanese have in every case derived these objects from China. The ornamental dwarf-trees, the form of range, the carpenters' tools, musical instruments, etc., of the Japanese have all been derived from China in precisely the same manner that our ancestors, the English, derived similar methods and devices from contiguous regions on the Continent.

The kitchen was a large, spacious room and had all the appliances for preparing a great banquet; copper kettles, large boilers, ladles, etc., were all there and so was the dirt. In this respect it was precisely the same as those I had already seen. Now, the amazing thing about it is this, that if a Chinese cook could be transported to a kitchen of some great house in this country and see the immaculate floor of tile or wood, the polished coppers, the incredible neatness and sweetness of everything, it would not excite the faintest emotion or envy. He would probably look upon it all as a vast waste of human energy, and would say, if he were capable of reflecting on anything, "So long as I keep the dirt out of the food, or at least render it invisible, what's the use of all this effort at dirt removing?" and he might quote our saying which is such a comfort to slovenly people, "Every man has to eat his peck of dirt."



Alley Wall and Cement Water-conductors, Canton.

In the rear of this great house was a large lotus-pond walled-in with brick; on each side were substantial summer-houses in which dwelt the concubines. A glimpse of the large reception-rooms only was permitted. Little bridges such as one sees depicted on old china spanned certain narrow places. Here was every opportunity to make a charming retreat, yet the pond was covered with slime and rubbish, the summer-houses were neglected and dirty, and, knowing the great wealth of the family, one was compelled to recognize this condition of matters in China as a national trait.

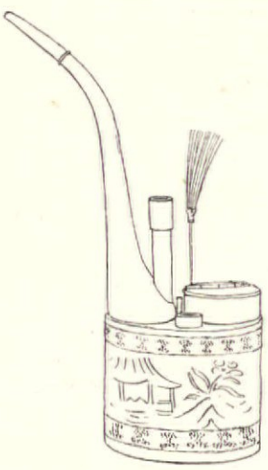
During my brief visit to this place it was plainly evident that I was *non personâ grata* and the intrusion would never have been made had any one given me the slightest premonition of the possible character of my reception, so my frankness of comment cannot be considered a breach of hospitality; there was no hospitality to breach.

I am not criticising the Chinese for this attitude, for it is about the only evidence of manhood from the standpoint of a Christian nation that they possess. It is too much to expect of a man that he should treat with more than cold reserve an individual who belongs to an alien race that has systematically robbed his people, filled his land with emissaries who have done their best to break down every sacred belief and cherished superstition, and that has defrauded his nation of vast tracts of territory and of enormous money indemnities.

I left the place by a narrow alley bordered by high walls of brick. The top of the walls had great rounded curves like the gable-ends of the Shanghai houses; these were imbricated with roofing-tiles, and just below the edge was a line of glazed panels having designs in high-relief. The water-conductors in the form of huge bamboo were made of cement, the joints and buds being well represented, the upper portion bulging out with flowers modelled in stucco and having no relation botanically with the bamboo. It is such incongruities in present Chinese art that jars upon the eye. It is possible, however, that some sentiment was to be conveyed by these flowers. The whole structure was an interesting illustration of the survival of form when the material of the device or the method of construction has been changed. This example was, of course, an obvious case, as bamboos are still used everywhere in the East as water-conductors.

. . . . . .

The Chinese are inveterate smokers of tobacco as well as snuff-takers. The tobacco is milder than ours and is cut in the finest threads. Among the wealthier classes a form of water-pipe made entirely of metal is used. These are often very elaborate and highly ornamented. The Salem Museum has a number of these pipes, and the accompanying sketch is a figure of one of them.

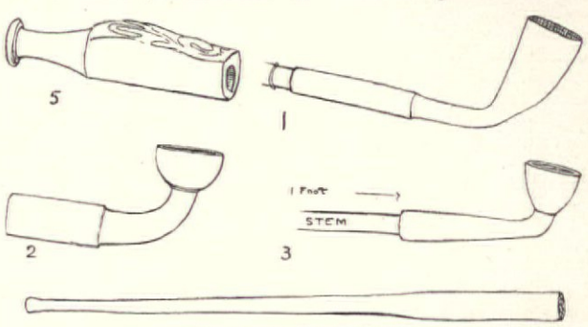


Tobacco Pipe with Water Receptacle.

A common form of pipe among the poorer classes consists of a metal bowl with short stem combined. Into this a wooden stem is fitted and on the other end a mouth-piece is secured. The mouth-piece is usually of metal, though bone, horn or jade may be used. The wooden stem may be 6 inches or 3 feet in length; when the stem is short it is often wound with tinsel or brass wire. The pipe-bowl may be a rough casting of brass or very thin white metal, the method of making being somewhat puzzling.

In Foo-Chow, according to Miss Gordon Cummings, the poorer classes use pipes in the form of large globular bowls of porcelain which are gaudily decorated. The thick wooden stem is 3 feet long and is used as a cane as well. These people use a coarse tobacco for their own use. The accompanying figures illustrate some of the pipe-bowls and mouth-pieces.

The Koreans use a similar form of pipe with long reed stems, and these are variously ornamented with curious designs burned on the surface. A fine collection of these Korean pipe-stems may be seen in the Museum in Salem.

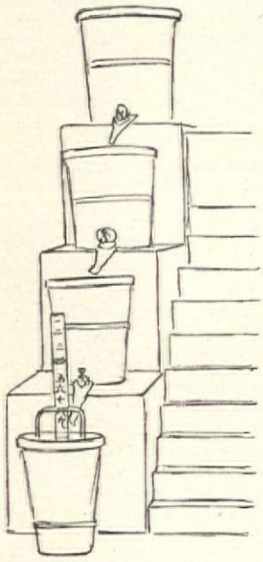


Figs. 1, 2, 3. Metallic Pipes.
Fig. 4. Metallic Mouthpiece.
Fig. 5. Jade Mouthpiece.

. . . . . .

The doorways seen on the street were in many cases very high, evidently to give ample room for the palanquins to enter. The doors are elaborately panelled and were double, and each door had two folds and these were hinged together. The door itself, instead of being hinged to the frame, was provided with a pivot above and below and close to the frame; these were held in appropriate sockets, the upper one being in the form of a carved embossment on the frame, the lower socket being made in the sill. This device is very ancient and may be found in the earliest Egyptian, Greek and Roman structures.

In my interesting wanderings about Canton my guide led me to the famous water-clock. It was a high building which looked as old as the clock, which was said to have been running for 400 years. The water-clock consisted of four deep copper vessels arranged on steps one above the other. A flight of short steps was at the side of this contrivance to enable the attendant to fill the upper bucket with water, and this has to be done twice in 24 hours. The water slowly drips through a faucet in the upper bucket to the next in turn, and so on down to the lowest one. In this is a float to which is attached an upright strip of wood having painted upon it the characters for one, two, three, and so on. This strip passes through a bail which spans the bucket, and as the float rises the numbers pass in succession through the bail and thus the hours of the day are rudely indicated. The keeper has a set of large boards upon which numbers are painted in black, and as each hour is indicated by the float the keeper hangs out a board with the corresponding number, and this may be seen only by those who are in a line with it down a rather wide avenue. Here the number remains in sight till the next hour is indicated by the float; in the meantime, unless one has closely followed up these sign-boards, there is no way of determining whether the time is one minute past nine, for example, or one minute to ten. To know the time within an hour seems to be quite enough for these peculiar people. I did not learn that a gong was beaten or a trumpet blown or a bell struck to announce the hours. Nothing, it seemed to me, could better illustrate the stolid and disastrous conservatism, the mental apathy, or, better, the atrophy of all adaptive and inventive faculty, in the nation, than this crude and primitive device. Thousands of Chinese have been abroad and while abroad have all had watches and clocks; in the poorest laundry place in America a clock hangs on the wall; in the Chinese theatre in San Francisco, a large Connecticut clock is hung against the wall over the stage in full view of the audience, and yet, here in Canton, a wealthy city of a million of inhabitants, the hours of the day have been rudely indicated by this ridiculous device for 400 years with only a small number of this vast population getting the benefit of it. EDWARD S. MORSE.



Water Clock, Canton.

[To be continued.]

NEW JERSEY ARCHITECTS' LICENSE LAW.

AN Act to regulate the Practice of Architecture.

Be it enacted *by the Senate and General Assembly of the State of New Jersey:* —

1. *Board of Architects.* — Within sixty days after the passage of this Act the Governor of the State of New Jersey shall appoint five persons, at least four of whom shall be, at the time of this appointment, architects residing in the State of New Jersey, and who have been engaged in the practice of their profession for at least ten years; the said five persons shall constitute the New Jersey State Board of Architects, two of whom shall be appointed to hold office for one year and three of whom shall be appointed to hold office two years.

2. *Succession of Board.* — Upon the expiration of the term of each member, the Governor shall appoint his successor for a term of two years, in like manner as the previous appointments; each member shall hold over after the expiration of his term until his successor shall have been duly appointed and qualified.

3. *Vacancies; Compensation.* — Any vacancy occurring in the membership of the State Board of Architects shall be filled for the balance of the unexpired term in like manner; the members of the Board shall serve without compensation for their services, except as hereinafter provided.

4. *Organization; Oath.* — The members of the New Jersey State Board of Architects shall, before entering upon the discharge of their duties, and within thirty days after their appointment, take and subscribe an oath before any officer authorized to administer oaths in the State, for the faithful performance of duty, and file the same with the Secretary of State; they shall annually elect from their number a President and a Secretary, who shall also be Treasurer, each of whom shall hold office for one year and until their successors shall have been duly elected and qualified; the Secretary and Treasurer shall receive such compensation for his services as may be determined by the Board.

5. *Rules, Records, etc.* — The Board may adopt all necessary rules, regulations and by-laws to govern its proceedings, not inconsistent with the laws of this State or of the United States; the Board may adopt a seal, and the Secretary shall have the care and custody thereof, and shall keep a record of all the proceedings of the Board, which shall be open to public examination.

6. *Quorum.* — Three members of the Board shall constitute a quorum.

7. *Special Meetings; Examinations.* — Special meetings of the Board shall be called by the Secretary upon the request of any two members by giving at least five days' written notice of the meeting to each member; the New Jersey State Board of Architects may adopt rules and regulations for the examination and registration of applicants desiring to practise architecture in accordance with the provisions of this Act, and may amend, modify and repeal such regulations from time to time.

8. *Public Notice of Changes.* — The Board shall immediately upon the election of each officer thereof, and upon the adoption, repeal or modification of the rules and regulations for the registration of applicants, file with the Secretary of State and publish in at least one daily newspaper in the State, the name and post-office address of each officer, and a copy of such rules and regulations or the amendment, repeal or modification thereof.

9. *Semi-Annual Examinations; Applicants.* — Provision shall be made by the State Board of Architects for holding examinations at least twice a year of applicants for registration to practise architecture, if there shall be any such applicants; any person over twenty-one years of age, upon payment of a fee of $5.00 to the Board, shall be entitled to enter any examination to determine the qualification for such registration.

10. *Who may be licensed.* — If the examination of any applicant for registration shall be satisfactory to the majority of the Board, and upon the payment of an additional fee of $15 to the said Board, a certificate shall be issued to the applicant, authorizing him to practise the profession of architecture; any person who shall at the time of the passage of this Act be engaged in the practice of architecture in this State, and who shall present to the State Board an affidavit to that effect, or a certificate from a similarly constituted Board of another State, and any person who is a member of the American Institute of Architects, shall be entitled to receive such certificate, upon the payment to the said Board of a regular fee of $5.00; each person licensed shall cause such license to be recorded in the Secretary of State's office.

11. *Revocation of License.* — Any certificate granted by the said Board or obtained by affidavit, as above provided, may be revoked by the said Board of Architects, for gross ignorance, recklessness, incompetency, dishonest practices, or other good and sufficient reasons: but before any certificate shall be revoked, the holder shall be entitled to at least twenty days' notice of the charge against him, and of the time and place, within the county of his residence, of the meeting of the Board, for the hearing and determination of such charge; for such purpose the Board shall have the powers of a court of record, sitting in the county in which its meeting shall be held, to issue subpœnas, and to compel the attendance and testimony of witnesses; witnesses shall be entitled to the same fee as a witness is allowed in the Circuit Courts of this State, to be paid in like manner; the accused shall be entitled to the subpœna of the Board for his witnesses, and a reasonable opportunity to produce his witnesses, and to be heard in person, or by counsel, in open public trial; the members of the Board shall have power to administer oaths and conduct such examination of witnesses under oath; and no certificate shall be revoked, except upon the unanimous vote of all the members of the Board; and any such revocation of certificates shall be certified in writing by the said State Board of Architects, under the hand of its President, or its President for the time being, and attested by the Secretary, with the official seal of said Board affixed thereto, and such certificate shall be filed in the office of the Secretary of State, who shall be paid the usual fee for filing similar documents in his office.

12. *Certified Copy in Evidence.* — A copy of any certificate granted by the said Board, or any revocation of the same, as by this Act provided, certified by the Secretary of State where the original certificate or revocation thereof is required to be filed by the provisions of this Act, to be a true copy of the original filed in his office under the hand and seal of the said Secretary of State, shall be competent and plenary evidence to prove the facts contained in the said certificate, to the same extent as if the original document had been produced and proved in any court of civil or criminal jurisdiction whatsoever.

Refusal of Certificate reviewable by Court. — Any person whose certificate shall be refused or revoked by said State Board shall have the right to appeal by *certiorari* to the Supreme Court for a review of such action, and the Supreme Court is hereby authorized and empowered to review and correct the action of said State Board, and the State Board shall forthwith carry out the judgment of the Supreme Court on such review.

13. *Penalty for practising without License.* — If any person shall pursue the practice of architecture in the State, or shall engage in this State in the business of preparing plans, specifications and preliminary data for the erection or alterations of buildings, or shall advertise or put out any sign, card or drawing, designating himself as an architect, having an office and doing business within this State without a certificate thereof, in accordance with the provisions of this Act, he shall be guilty of a misdemeanor, and upon conviction shall be fined not less than $50 and not more than $500 for each offence, or imprisonment in the county jail for a period of not less than one month.

14. *Exceptions.* — But nothing herein contained shall be construed to prohibit students or employés of licensed architects from

acting upon the authority of such licensed architects, or to prohibit any person in this State from acting as designer of any building that is to be constructed by himself or his employés, or to prevent any person from employing another person to prepare plans and specifications for the erection of any building with the full knowledge upon the part of said owner that said person is not a regularly registered architect according to the provisions of this Act.

15. *Expense of Board.* — The expense of said Board, and of the officers thereof, and of the examinations held by said Board, and of any other matter in connection with the provisions of this Act, shall be paid from the registration-fees above provided for, and not otherwise; and in no case shall any of such expense be paid by the State of New Jersey or be a charge against the said State.

16. *Annual Report.* — An itemized account of all receipts and expenditures of the said Board shall be kept by its Secretary, and a detailed report thereof, each year ending with the thirtieth day of September, duly verified by the affidavit of the said Secretary, shall be filed with the Secretary of the State within sixty days thereafter; the said Secretary of State to be paid such fees therefor as are now paid for filing similar papers in his office.

17. *Expenses met.* — The members of the Board shall be entitled to reimbursement for their travelling and hotel expenses, incurred in pursuance of their duties, not to exceed $5.00 per diem for each member of the said Board; the Secretary and Treasurer of the State Board of Architects shall receive such annual compensation as shall be provided by the Board, by resolution adopted by it at a regular meeting; no member of the Board shall be held personally responsible for any portion of the Secretary and Treasurer's salary, should the fees for certificates received by said Board be insufficient to meet the same.

18. *Disposition of Surplus.* — Any surplus of fees remaining in the Treasury after the payment of the expenses of the members of the Board, and the salary of Secretary and Treasurer, as herein provided for, shall be paid annually to the Treasurer of the State of New Jersey and shall only be paid out upon the warrant and authority thereafter of the Comptroller of the State.

Approved March 24, 1902.

RULES OF THE NEW JERSEY STATE BOARD OF ARCHITECTS.

RULES.

1. Roberts's Rules of Order shall govern the conduct of business at the meetings of the Board.

OFFICERS.

2. The State Board of Architects shall annually elect from its number a President and a Secretary, who shall also be Treasurer.

Said officers shall hold office until their successors shall have been duly elected and qualified.

The Secretary shall keep a record of all the Proceedings of the Board, which shall be open to public examination.

HEADQUARTERS.

3. The headquarters of the Board and the office of the Secretary and Treasurer shall be at 1 Exchange Place, Jersey City, N. J.

FINANCE.

4. All funds collected shall be deposited in bank to the credit of the Board, and all checks shall be signed by the Secretary and Treasurer and countersigned by the President, and no disbursements shall be made except on order of the Board. There shall be an Auditing Committee composed of the three members of the Board other than the President and the Secretary and Treasurer, who shall audit the Treasurer's accounts at least semi-annually. All bids shall be presented to the Board at a regular meeting.

MEETINGS.

5. The regular meetings of the Board shall be held at its headquarters on the third Friday of each month at 3 P. M., unless the time and place shall be otherwise ordered by the President. Special meetings of the Board shall be called by the Secretary upon the request of any two members by giving at least five days' written notice of the meeting to each member. Three members of the Board shall constitute a quorum.

EXAMINATIONS AND CERTIFICATES.

6. Any person over twenty-one years of age, upon the payment of a fee of Five ($5.00) Dollars to the Board shall be entitled to enter any examination to determine his or her qualifications for such registration. If the examination of any applicant for registration shall be satisfactory to the majority of the Board, and upon the payment of an additional fee of Fifteen ($15) Dollars to the said Board, a certificate shall be issued to the applicant authorizing him or her to practise the profession of architecture. Any person who shall at the time of the passage of this Act be engaged in the practice of architecture in this State, and who shall present to the said Board an affidavit to that effect, or a certificate from a similarly constituted Board of another State, and any person who is a member of the American Institute of Architects, shall be entitled to receive such certificate upon the payment to the said Board of Five ($5.00) Dollars.

Each person licensed shall cause such license to be recorded in the Secretary of State's office.

The examination of applicants for the practice of architecture shall be conducted by the Board, who shall publish a programme for examinations for certificates and for all other matters connected therewith.

The Board shall issue certificates to architects entitled to receive them as provided for in Sections 9 and 10 of the Act to regulate the Practice of Architecture as approved March 24, 1902. In all cases where an applicant for a certificate to practise architecture in the State of New Jersey shall cite to the Board existing buildings erected from his or her design and under his or her supervision, and when the character of such work and the applicant's connection therewith are such as to satisfy the Board of the applicant's ability to practise architecture, said demonstration shall take the place of written or oral examination. In carrying out this rule the Board shall require the personal attendance of the applicant when said applicant is a resident of the State of New Jersey. Applications for certificates from residents of other States may be considered at any meeting of the Board without the personal appearance of the applicant. If the proofs submitted in connection with said applications from resident and non-resident architects establish an ability equal to that demanded by the regular written and oral examinations, the Board may issue its certificate to the applicant.

Regular written and oral examinations shall be held as provided by the Act of March 24, 1902. The time shall be devoted to ascertaining the ability of the candidate to make practical application of his or her knowledge in the professional work of an architect. The examination shall be directed toward ascertaining the qualifications of the applicant in draughtsmanship, rendering, construction, design and the art of planning.

A diploma of graduation from the full course in architecture in any university or technical school approved by the Board may be accepted as satisfactory evidence of a competent knowledge of architectural design and construction, and shall entitle the recipient to a certificate to practise as an architect in the State of New Jersey, providing said applicant shall present evidence satisfactory to the Board that he or she has acquired the ability to successfully apply his or her knowledge to the designing construction and supervision of buildings, and shall have paid the fees of Five ($5.00) Dollars for admission to examination and the additional fee of Fifteen ($15) Dollars for certificate as prescribed by the Act.

Application for examination will be received at any time and should their number and urgency make it seem expedient to the Board to hold examinations at any time other than heretofore mentioned, due notice of such additional examinations will be forwarded by the Secretary to those whose applications are already filed at his office. Applications to enter a semi-annual examination should be at the Secretary's office one week before the time set for said examination.

Each member of a firm of practising architects must have a separate certificate. All certificates shall be signed by the President and Secretary.

SEAL.

7. The Board shall adopt a seal for its own use and shall have the words "New Jersey State Board of Architects" inscribed thereon, and the Secretary shall have the care and custody thereof.

Every registered architect *should* have a seal, the impression of which should contain the name of the architect, his place of business and the words "Registered Architect," with which all plans prepared by him should be stamped. Seals should be circular and 2 inches in diameter. The words "State of New Jersey" should appear at the top, the words "Registered Architect" at the bottom, the name and place of business in the centre. Where there is a co-partnership of architects the different names of the several members may appear on one seal. A seal should be used and not a rubber stamp.

CHARLES P. BALDWIN, Newark, *President;* HUGH ROBERTS, Jersey City, *Secretary and Treasurer;* ARNOLD H. MOSES, Camden; CHARLES EDWARDS, Paterson; DAVID B. PROVOOST, Elizabeth.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE NATIONAL BANK OF COMMERCE BUILDING, ST. LOUIS, MO. MR. ISAAC S. TAYLOR, ARCHITECT, ST. LOUIS, MO.

THE new National Bank of Commerce Building, located on southeast corner of Broadway and Olive St., is an office-building and bank combined, covering an area of 90′ x 187′, and cost, completed, $1,000,000. The exterior is built of Somes Sound, Me., granite, except cornice, which is of terra-cotta, to match the color of granite. The principal innovation introduced in this building is the fourteen marble columns in the bank-building. These were turned from the solid marble, then cored and slipped over the steel supports before second-story framing was installed.

DESIGN FOR THE ALBANY CHAMBERS, ALBANY, N. Y. MR. L. W. LOTH, TROY, N. Y., AND MR. F. R. COMSTOCK, NEW YORK, N. Y., ASSOCIATED ARCHITECTS.

BIRMINGHAM UNIVERSITY, BIRMINGHAM, ENG. MESSRS. ASTON WEBB AND E. INGRESS BELL, ARCHITECTS.

THIS plate is copied from the *Builder*.

[The following named illustration may be found by reference to our advertising pages.]

DESIGN FOR NEW ORGAN-GALLERY AND CASE IN THE CHAPEL, HAILEYBURY COLLEGE, ENG.

THIS plate is copied from the *Builder*.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE INSURANCE ENGINEERING EXPERIMENT-STATION.

BOSTON, MASS., June 3, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In rejoinder to your editorial of May 31st on the Insurance Engineering Experiment-Station, please state that any architect, insurance-man, owner or other person who is interested in this undertaking may consider himself insured for $100,000 whether he holds such policies or not. He may then make a voluntary assessment upon himself of one cent per $100, say $10, remit that to me and thus become entitled to all the reports which may be issued on the work done in the Experiment Station. He will take his chance, as all the contributors have done, on the work proving to be worth its cost.

If "architects understood much better than mill-engineers or insurance-men the departures from the standard construction which really constitute the greatest danger in modern steel-frame buildings," as you put it, nothing could be more conducive to the work which we have undertaken than to have them communicate their knowledge to us or to put any questions to us which they themselves have not yet been able to answer. The doubts about present methods of steel-construction and the durability of the buildings are at present nearly all hypothetical. If architects can point out the way for us or show us the place where any actual examination of the condition of steel structures is now possible, they will do us a great service. Permit me to express a doubt as to there being any real knowledge based on facts which can be proved, as to most of the problems which we have undertaken to solve. If examinations could be made into the condition of existing steel frames, it might not be necessary to wait ten years, more or less, for the development of our own experimental structures. But where is the owner who will permit the steel in a building controlled by him to be uncovered, and where is the owner who will permit any thorough examination of a building ten or fifteen years old to be made?

You refer to the "usual underwriter's scorn for architects," hoping that we may invite suggestions from them. I think you are in error in using that term. Mutual underwriters have a great deal of sympathy for architects who, knowing better, are forced by owners and contractors to plan bad and unsafe buildings. On the other hand, to the mutual underwriter the common instruction in architecture appears to be defective. I have yet to know or hear of a problem being submitted to students in architecture for the construction of a textile-factory, paper-mill, workshop or warehouse, under the condition that the plan, elevation and decoration shall be made subordinate to the motive of the building and that the æsthetic effect shall be gained without wide variation from the customary cost, and with no variation that will impair the effective use of the building for its purpose. When such a problem is submitted and worked out by students in their architectural course it may become safe to employ the professional architect in industrial work. There are many owners and promoters of mill-construction who would be eager to relieve their buildings of the dreary monotony and lack of æsthetic effect by which they are afflicted, but they cannot sacrifice the effective use of the buildings merely to promote architectural effect.

During my business experience I have dealt with one large mill in which the services of a professional architect were called for in order to give it a good æsthetic appearance. He put on a roof-story which cost $10,000 for alteration before it could be made safe and which was never well adapted to the necessary work. In another instance I myself called for a plan of a mill-tower, in order to give good effect to an otherwise rather bare structure. The plan given me, in spite of all the caution that I could submit, was one that would have made the tower cost more than the mill.

My understanding of what constitutes good architecture is that the first consideration shall be given to the motive and use of the building and that all exterior effect shall be subordinated and so worked out as to be consistent with the prime motive of those who are putting up the building. A fine elevation of a costly stone church covering in and screening a dangerous interior construction of wood may not be called a "whited sepulchre," but may surely be entitled a concrete form of "petrified religion screening a sham."

Yours very truly, EDWARD ATKINSON.

NOTES AND CLIPPINGS

VORONIKHIN, THE RUSSIAN ARCHITECT. — In 1800 the Emperor Paul conceived the idea of building a magnificent cathedral in the "Nevskii Prospect" of St. Petersburg, to be dedicated to "Our Lady of Kazan," and Voronikhin, who was then professor at the Academy of Arts, was appointed architect. In the following year the first stone was laid by the Emperor Alexander, and the edifice was completed and solemnly consecrated in September, 1811. Criticism has not been sparing of its remarks — some of them exceedingly captious — on this piece of architecture. For no other reason than because the principal façade is extended by a semicircular colonnade, it has been called a copy of St. Peter's at Rome on a reduced scale, whereas there is no one point of similarity between the two buildings in any other respect. To note but one or two trifling differences, the front of St. Peter's has no prostyle or portico, and the pediment is a mere sham, one of most insignificant proportions; the colonnades again are there neither on the same scale nor of the same order as the church itself, nor are they combined with it. Andrei Nikophorovitch Voronikhin, the architect, was born in 1760, among the peasantry of Count Alexander Stroganov, who having heard of his talent for drawing sent him in 1777 to Moscow in order to be properly educated as an artist, and he there received some instruction from Bazhenov and Kazakov, two eminent architects. He was then sent to travel with his patron's son, Count Paul Stroganov and after visiting the southern provinces of Russia, Germany and Switzerland, resided for some time at Paris, diligently profiting by the opportunities there afforded of pursuing his architectural studies. In 1790 he returned to St. Petersburg, where Stroganov's protection soon brought him into notice and obtained for him employment. — *The Architect.*

PENAL-CODE SECTION RELATIVE TO HOURS OF LABOR UNCONSTITUTIONAL. — Subdivision 1 of Section 384 of the Penal Code of the State of New York, making it a crime on the part of any person or corporation, "who, contracting with the State or a municipal corporation shall require more than 8 hours' work for a day's labor," has been declared unconstitutional by Judge Beattie of the Orange County Court. The Orange County Road Construction Company had secured from the State and the Board of Supervisors of Orange County a contract to improve and construct certain roads in that county, and had been indicted for requiring of its workmen more than 8 hours as a day's labor. Judge Beattie bases his decision on the case of People ex. rel. Rodgers *vs.* Coler (166 N. Y., 1), in which the Court of Appeals practically held the labor law to be unconstitutional. He says in part: "The obvious purpose of the labor law was to narrow as far as possible the field from which a supply of laborers could be obtained, by prohibiting directly the employment of aliens, and indirectly the employment of non-residents, and, having done this, to destroy, to the extent that the extra time represented actual value and labor, the benefit to be derived by contractors from work which might have been accomplished in 10 hours as distinguished from the work done by the same laborers within 8 hours. The whole effect of the legislation was to compel payment for time during which no labor was to be performed. The law fixed the length of the day, not with reference to the ability of a person to labor or with relation to the hours during which labor could not be properly or advantageously done. It did not undertake to strike at early hours or late hours, but arbitrarily fixed the length of the day, so that for a day's pay the employer should receive just so much less labor. If it is permissible to impose such burden upon the employer by fixing the length of a day at 8 hours, there is nothing to prevent a lessening of the time, so that at the dictation of some interest, a half-day's labor should be counted as a full day's work." — *N. Y. Times.*

WIND CAVE, SOUTH DAKOTA. — The Government has just finished making a survey of the famous Wind Cave, a remarkable freak of nature near Hot Springs, which is to be thrown open as a public park. Wind Cave was discovered some dozen years ago by a cowboy, a gushing wind blowing his hat some distance down the gulch. The following day returning with unbelieving friends, the discoverer found the current reversed and his hat was sucked in out of sight. The direction of the wind is governed by the barometer. There are 3,000 chambers, and over 90 miles of passage-ways have been explored and opened to the public. The area is more than 2 miles square. It is the intention of the Government to give the public free access to the cave, but it will never be visited without a guide. While there are well-trod trails, no one not familiar would dare venture far from the entrance. The trip through one of the three principal routes can be made in about 3 hours, the distance being 5 to 7 miles. The principal chambers have been named and dedicated by lodges, fraternal orders and denominations, so that nearly every person visiting the cave finds special attractions. — *Boston Transcript.*

PROFESSOR MERRIAM'S MONUMENT AT ATHENS. — The monument which the members of the Archæological Institute of America decided to erect over the grave of Professor Merriam at Athens has been completed. Professor Merriam was Professor of Greek Archæology and Epigraphy in Columbia University. His death occurred in January, 1895, in Athens, where he was on leave of absence. The monument was designed by Edward L. Tilton, the architect of the Argos excavations, who offered his services as a personal tribute to the memory of Professor Merriam. Funds for the monument were provided by William E. Dodge, Heber R. Bishop, Frederic J. De Peyster, S. P. Avery and ex-President Low. — *N. Y. Tribune.*

BLASTING WITH FREEZING WATER. — An interesting bit of quarrying was recently accomplished at Rubislaw quarries, Aberdeen, Scotland. A large stone had been drilled, ready for splitting, when the thought struck the foreman that the severe frost which prevailed might be utilized. Water was poured into each of the drill-holes, and it was found after a couple of days that the block of granite had completely burst open. An idea of the immense power of the frost will be gathered when it is stated that the stone thus detached measures 12′ x 5′, and has a weight of about six tons. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, JUNE 14, 1902 No. 1381

CONTENTS

SUMMARY: —
Fire-escapes for New York Hotels. — Blasting and the Rights of Invalids. — Crops, Trusts and Dividends. — The *Builder* on American Taste in Colossal Statues. — Trade Unions and the Apprentice Question. — Truro Cathedral Repairs. — Defective Pier Foundations. — An Object-lesson in the Inflammability of Celluloid. 81
JOURNAL SKETCHES IN CHINA. — VI: CANTON. 83
A CRITICISM OF THE SHAW MONUMENT. 85
ON COLORED WAX STOPPINGS. 86
THE UNDERGROUND PASSAGEWAYS OF ENGLAND. 87
ILLUSTRATIONS: —
The United States Court-house and Post-office, Salt Lake City, Utah. — Exterior Details of the Same. — The Birmingham University, Birmingham, Eng.
The Villa Hofmann, Mannheim, Baden. 87
NOTES AND CLIPPINGS. 88

IT would take a very strong and nearly unanimous appeal from our subscribers to induce us to continue the form of publication which, during the current quarter, has been given experimentally to our International Edition. We are not satisfied with the practical working of the new method, which seemed to have the promise of many desirable possibilities in its favor, and believe that no mistake will be made in returning at the earliest practicable moment to the original form of publication. From the first issue for July, therefore, subscribers to the International Edition will again receive their copy in its familiar blue-covered weekly form.

THE New York Department of Buildings has been very active of late in examining hotels, and prescribing fire-escapes, and contracts are said to have been already made for the equipment of more than two hundred and fifty hotels. Among others, the Fifth Avenue Hotel is to have two new fire-escapes on the Madison Square front; the Holland House is to have one on Thirtieth Street, and the Waldorf-Astoria is to have two on the west wall. For the Hotel Imperial, a rather small building, constructed about fifteen years ago, and supposed to be perfectly fireproof, six new lines of fire-escapes have been ordered, two on Broadway, two on Thirty-first Street, and two on Thirty-second Street. The proprietors of the better class of hotels have shown a commendable willingness to comply with the directions of the Department, and hotel guests in New York will soon be able to sleep with confidence of security, at least against the dangers of fire. Whether the abundance of fire-escapes will bring any counterbalancing annoyances remains to be seen. Years ago, when the law was adopted in New York requiring a rope to be placed at the windows of every hotel bedroom, long enough to enable its occupant to climb down to the ground in case of fire, some of the hotel proprietors complained that their guests utilized the ropes to depart without paying their bills. The fire-escapes would be less available for this purpose than the ropes, but it is not impossible that they might, in hotels less carefully guarded than those on Fifth Avenue and Broadway, occasionally serve for the entrance or exit of thieves.

THE death of the lamented James Brown Lord, in New York, has given occasion for a discussion of much interest to contractors and owners. During Mr. Lord's illness, the owner of the adjoining estate undertook some blasting operations, which caused great annoyance to the neighborhood. The people who were in good health were able to move away while the annoyance lasted, but Mr. Lord could not be moved, and suffered greatly from the noise and nervous shocks incident to the blasting. Mr. Lord's family, unable to secure a temporary suspension of the operations, applied to the Federal Court, but obtained no relief, the Court holding that in such cases the only remedy of the sufferer lay in an appeal to the humanity of the offender. This seems to have been a slender reliance, for the blasting continued, and Mr. Lord's death is believed to have been hastened, if it was not caused, by his sufferings from it.

MR. RUSKIN once made a characteristic addition to the science of political economy by observing that "Food can only be got out of the ground, and happiness only out of honesty." What degree of happiness the promoters of "trusts" and "amalgamations" and "deals" are likely to find, in this world or elsewhere, we will not inquire, but it is worth remarking that the extraordinary fever of activity and speculation which we have witnessed for the last three years followed, in time, at least, if not in any relation of cause and effect, three years of enormous crops in the West. Politicians, naturally, attribute all prosperity to their own efforts; and the Republicans have not failed to point to the immense railway traffic, and the unparalleled consumption of iron in this country, as the results of the protective system for which they claim to be responsible; but the protective system has been established for thirty years, and was in full force at the time when Mr. Bryan was urging the Western farmers to fall upon the "money-lenders" of the East, and make up out of their pockets the deficits incident to agricultural operations; when one-third of all the railway mileage of the United States was operated by receivers in bankruptcy; when structural iron was sold here for less than one cent per pound, and when learned and ingenious articles appeared every day in the newspapers and magazines, proving that the wheat-growing capacity of the American soil was exhausted; that modern conditions had permanently reduced the possible return from railway traffic, and that overproduction had brought ruin upon American industries. Then followed three years of great harvests; Southwestern Kansas, which, owing to its dry climate, had the reputation of producing a crop only one year in five, and which its inhabitants were represented as being on the point of abandoning, had three enormous crops in succession; and the "exhausted" American soil proved more productive than ever, while the wheat crops of Argentina, Russia and India were deficient. It must be remembered that a single good crop on a Western farm often sells for a sum equal to the whole value of the farm; and the agriculturists who, a short time before, wanted to rob the Eastern capitalists who had lent them the money to buy their farms now paid off their mortgages, put cash in the nearest bank, and invested the surplus in such articles of luxury as pleased their fancy. The railroads soon felt the effect of having large crops to haul to the East, and pianos, bicycles and building materials to carry back again, and many of the lines recently bankrupt began to pay dividends. This condition of things has lasted until now, with the sinister addition, of late, of a speculation so wild that the trust companies of New York, for example, have, according to their own statement, only nine million dollars in cash among them with which to meet checks on nine hundred millions of deposits. Whether a reaction will come, and, if so, how soon it will arrive, and how violent it will be, are matters which no one, perhaps, can predict; but, although the railroad managers say, with undoubted truth, that the transportation of grain furnishes only a small part of their revenue, there is reason to believe that a much larger portion of their income is dependent upon the prosperity of the people who raise the grain, and that a year or two of severe drought, or of locusts, would produce the same effect that similar causes have produced so many times before.

THE *Builder* has some singular ideas about the United States, and not the least singular of these is one which we find in a recent issue, relating to statues. Speaking of the colossal statue of King Victor Emmanuel, now on the point of being cast in bronze for the adornment of his great monument in Rome, and comparing it with the figure of Saint Charles Borromeo, at Arona, on the Lake Maggiore, it says that "This statue may be, perhaps, — and it is to be hoped will be, — considered as the final attempt of the Italian sculptors in the 'colossal style'." It then informs its readers that in Italy, within the past few years, "many statues of this kind have been executed in marble and bronze for home consumption and for America." It would puzzle an American to say where these colossal statues have been put; but the *Builder* enlightens our darkness by saying that "A portrait statue of one of the Vanderbilts as a River God, many yards high, was commissioned in Florence for some American town fifteen years ago, — a sample of the American taste in such things

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

which culminates in the lighthouse of New York." We should be glad to know what American town is graced with a colossal statue, or any other kind of statue, of any member of the Vanderbilt family in the disguise of a River God. Americans are not, as a rule, inclined to invite public ridicule by foolish display, and a family less disposed to anything of the kind than the one in question it would be hard to find, in America or anywhere else.

AS for the New York "lighthouse," which the *Builder* regards as the "culmination" of the American bad taste which delights in colossal Vanderbilt River Gods, it may be well to observe that the New York statue of "Liberty," which, by the way, never has been of any use as a lighthouse, and now does not even have its torch lighted, although it is certainly colossal, is not a product of American taste, but was designed and executed in France, by a French sculptor, at the request of French admirers of the United States, for presentation to the city of New York. Moreover, instead of being the "culmination" of a series of American works of the sort, it is almost the only colossal statue in this country, with the exception of the figure of "Liberty" crowning the Capitol at Washington, and the William Penn on top of the tower of the Philadelphia City Building, neither of which pretend to any merit as sculpture; and it was regarded at the time as an introduction to this country of a form of art which has been popular in the Old World for at least seven thousand years. The *Builder* pays, unintentionally, a very pretty compliment to the Americans, when it sneers at them for sharing with the Greeks and Egyptians the taste in sculpture which produced the Olympian Zeus, and the Athena of the Acropolis, to say nothing of the multitudes of gigantic statues in Egypt. As a matter of fact, the fashion of erecting colossal statues, which the *Builder* lays to the Italians, prevails more in France than anywhere else, except, perhaps, of late years, in Germany. Bartholdi was chosen to carry out the New York statue of "Liberty," which we venture to consider a very beautiful and successful design, in part on account of the reputation that he had gained by his colossal statue of Vercingetorix, which stands on the hill of Alesia, near Dijon; and many other colossal figures exist in various parts of France as well as in Italy.

A VERY important trade-union case was decided in England a short time ago. One Read, a man twenty-five years old, made a contract of apprenticeship with Wigg & Wright, stone-masons, by which he was to work for them for three years, receiving fifteen shillings a week as wages during that time, and they were to teach him the trade of a stone-mason. Wigg & Wright, as well as all their journeymen, were members of the "Friendly Society of Operative Stone-masons." One of the rules of the Society, which Wigg & Wright, as employers, had agreed to, and signed, provided that no one over sixteen years of age, except masons' sons and step-sons, should be received as an apprentice. When Read had been working for Wigg & Wright nearly three months, the Society held a meeting, at which his case was taken up, and a resolution was passed, to the effect that if he did any work for the firm as a stone-mason, the Society should be immediately notified. In consequence of this action, Wigg & Wright kept Read employed only as a laborer, and did not give him any of the instruction in their trade that they had promised. Some nine months later, the Society, which seems to have been alarmed by Read's intelligence, notified Wigg & Wright that, if he was given any stone-mason's work to do, "prompt action" would be taken; this "prompt action" being, as the officials of the Society confessed, a strike at two hours' notice. Read then brought suit against the Society for damages, for having wrongfully and maliciously induced Wigg & Wright to break their contract with him. The lower Court found for the defendants, holding that they had acted in good faith, and from no improper motive, and that Read had no cause of action; but the King's Bench has now reversed the decision. The Court said that Read, by virtue of his contract, had a right to demand that Wigg & Wright should teach him their trade. The Society claimed that it had also a contract with Wigg & Wright, which was inconsistent with their contract with Read. The Court said that the existence of this contract was not sufficiently shown by the evidence; but supposing it to exist, if it was in restraint of trade, it was illegal, and incapable of enforcement, and the majority of the Court were of opinion that the case should be remanded for a new trial. The Lord Chief Justice, in a separate opinion, went farther than his colleagues, holding that judgment should have been ordered for the plaintiff. Supposing the contract between the Society and Wigg & Wright to have existed, the Society was at liberty, if it suffered any injury from its violation by Wigg & Wright, to claim damages from them. Instead of this, the officers of the Society, without pretending that the Society, or any of its members, was injured, or was likely to be injured, by the action of Wigg & Wright, unreasonably induced them to commit a wrong against Read.

WE do not know that Americans would be considered as having a right to criticise the plans of English architects; but the repairing of Pearson's beautiful Truro Cathedral is a matter of general professional interest. It seems that the bases of some of the piers in the building have cracked, and Sir Thomas Drew, who was called in to examine them, has made a report, illustrated with diagrams, setting forth very clearly the causes of the trouble, and making suggestions for remedying it. As shown in the diagrams, the foundations under the piers seem to be of coursed rubble, very poorly bonded, and so arranged that the outer stones run only about one-third their length under the pier, the other two-thirds projecting outside. The most elementary principles of construction, as taught to American students, point out that, with a foundation built in this way, the reaction of the ground tends to tilt upward the free end of the outer stones, dislocating the rubble-work below, and throwing the weight of the pier on a small surface of masonry under the middle portion of it. The diagram shows no attempt to prevent such dislocation by the bonding; on the contrary, the joints could hardly be arranged more favorably for it. The bases of the piers are made of two large flat stones, one above the other, one less than twelve inches thick, and the other less than ten inches; and we cannot consider it surprising that such stones, resting on a foundation of which the inner portion was settling under compression, while the outer part was being tilted upward with enormous force, should have broken. The Report suggests that the trouble may have been due to the bed of asphalt, half an inch thick, which was interposed, as a damp-course, between the base of the pier and the rubble foundation. It is true that a layer of asphalt, which is always more or less plastic, and would yield to any force tending to cause lateral movement of the foot of the pier, is an objectionable feature in such a construction, but we cannot see how it should have contributed to the fracture of the base-stones. On the contrary, it would be likely, by its plasticity, to delay for a short time the effect of the rolling of the outer foundation-stones.

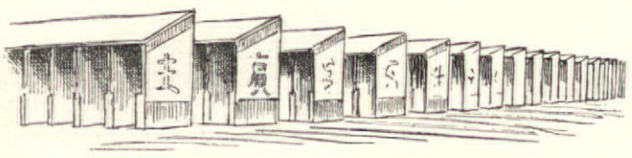
THE remedy suggested by Sir Thomas Drew for the trouble looks, at first sight, rather doubtful. According to the diagram given in the Report, he proposes to shore up the injured piers; remove the broken base-stones, replacing them with a single stone, instead of two thin ones; lower the rubble foundation, apparently by taking off the upper course, and replace this course by a layer of concrete, of the same thickness. If this layer of concrete were stiffened with a sufficient number of iron beams, as would be done in this country, the remedy would probably be effectual; but, as the concrete course is shown projecting, to a distance considerably more than twice its height, beyond the base of the pier, it would, without the embedded gridiron of beams, probably soon break off under the pier, at a little distance inside the face of the plinth, throwing the load, as before, on the middle portion of the foundation, and allowing the rubble blocks on the outside to roll as badly as ever.

CELLULOID is so much used now that it might be well to remember that it is a highly combustible, not to say explosive, substance. Not long ago, according to *Fire and Water*, a party of insurance officials were dining in honor of one of their number, and in the course of the after-dinner oratory, one of the speakers, to make room for the utterance of his eloquent periods, took his cigar out of his mouth, and laid it on the table. The lighted end of the cigar happened to come in contact with the celluloid handle of a dessert knife, and, in a moment, there was a bright flash, and the celluloid covering of the handle began to blaze. The fire was extinguished by plunging the handle of the knife into a finger-bowl, but the insurance-men present added a mental memorandum of the properties of celluloid as a fire-hazard to their stores of professional knowledge.

JOURNAL SKETCHES IN CHINA.[1]—VI.

CANTON.

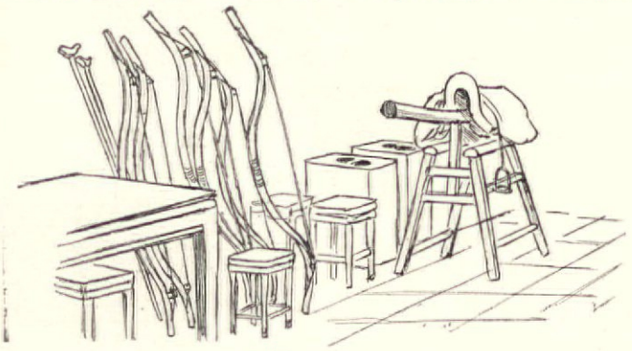
I WAS naturally curious to see the prison in Canton, having seen the one in Shanghai. That was so vile that, in the more refined city of Canton, I was led to believe that there might be some advance in prison management. If anything, it was even worse than the northern horror. The prisoners looked starved and were in the most ragged and most haggard condition. Many of them were loafing in the prison-yard; others were in low coops, hardly high enough to accommodate a dog; some had their heads thrust through square plank-like affairs, unable to reach their faces, over which flies crawled at will.



Examination Hall, Canton.

They could not, of course, feed themselves, but had to depend upon relatives or humane friends to perform this service. Nearby was a simple enclosure surrounded by high walls, known as the execution-grounds. At the time of my visit, the ground was covered with pottery in the form of little kitchen braziers; apparently some one had hired the place for the temporary storage of his pottery stock. Near the walls were larger jars, in which the heads of the executed were placed. Judging from the description of the Spanish prisons in Cuba, Porto Rico and the Philippines, Spain is the only European country which must be placed on a level with China in this respect.

The examination-hall, as it is called, though there was no trace of a hall on the grounds according to our meaning of the word, consisted of rows of long, narrow sheds running at right angles to a broad area which might be called a yard or avenue. These low sheds were divided by partitions open in front; if they had been furnished with doors they would have resembled the bathing-houses along our seaside resorts. These structures were built of brick, with brick partitions, and the individual cells were not over 4 feet wide. The number of them has been variously stated to be 7,500 and 10,000. The candidates who compete for examination come from all parts of the Empire. These include young men and old men, some of whom have reached the age of eighty or ninety years, who have been competing since they were boys and appear again and again to win the coveted prize of recognition and, if successful, to get some office under Government with a modest stipend, the balance of their salary being squeezed out of the inhabitants by fraud and persecution. Early in the morning a single text from Confucius or some other ancient classical writer is issued to all, each one receiving the same text. On this they are all to write an essay and deliver it the next morning. An ignoramus on everything but Chinese classics may beat other numbskulls in writing the best composition on the text given and attain some office dealing with matters pertaining to the nineteenth century. As an illustration, a competitor has secured a position in the army by passing a literary examination on the art of war, not as understood to-day, but with the art as set forth by authorities 3,000 years ago. One of these authorities, held in highest repute, Sun-Tse by name, solemnly recommends such a manœuvre as this: "Spread in the camp of the enemy voluptuous musical airs, so as to soften his heart." No wonder in the recent war with Japan, Chinese generals were found with singing-birds in cages and a retinue of concubines, while every soldier carried a fan and every third one a banner. How inferior the Japanese in these matters! Undaunted by the slurs of English writers, who have repeatedly stigmatized the Japanese as a nation of copyists, they sent their students to military academies abroad; their men graduated at our Naval Academy; then they established a naval college of their own, and to-day their army and navy, in effectiveness and morale, are fully abreast of the armies

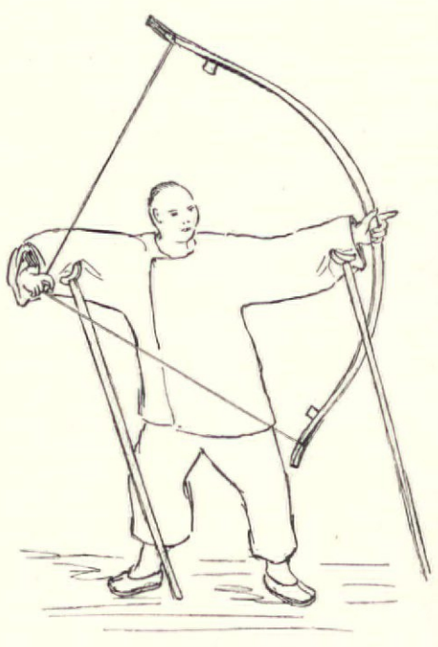


Drill Room, Canton.

and navies of Europe and, according to an English military critic, superior to many of them.

The matter of literary examination for public office has been repeatedly dwelt upon, yet no one can realize the overpowering absurdity of it until he comes to examine the conditions minutely. China is supposed to have an army and navy, arsenals and departments of telegraph, customs, etc. Now, let one open a page of Confucius, the "Doctrine of the Mean," or "Analects," for example, or any ancient classic, and find if he can a single line which would enable him to perform any of the duties involved in the above departments. Everywhere he would find admonitions to be just, good and honest. References to an honest judge and upright ruler, etc., frequently occur in these venerable pages, but of telegraphy, railroads, customs or anything else pertaining to nineteenth-century civilization not a word. He has evidently taken these moral admonitions in the usual Chinese reverse sense, for outside of the municipal affairs of New York and Philadelphia no greater corruption or dishonesty exists than can be found in China. Despite the fact that their armies have been repeatedly beaten by small bodies of European soldiers and, within recent years, suffered an ignominious and crushing defeat at the hands of Japan, in each case paying enormous indemnities, the Chinese still go through these antiquated examinations in order to secure positions in these modern departments. The appointments in the British Army are nearly as absurd as the Chinese practice, though based on a different method.

Very near my hotel was a school for archery and other military exercises. My Portuguese landlord offered to guide me to the place. There were a number of Manchu soldiers practising at the time, and they looked up frowningly as we came in. In this place were not only implements for archery practice, but evidently for bow and spear exercises on horseback, as there was a saddle mounted on a big wooden support and numerous appliances were at hand for these exercises. Heavy blocks of stone were on the floor, upon which the soldiers developed their lifting-muscles. Huge iron implements with short cutting swords at the end rested against a heavy framework of wood; these had an iron shaft 7 feet long and at least 2 inches in diameter, with the additional weight of what appeared to be a small grindstone at one end and massive ribs of iron at the other. They were so heavy that I could not lift one from the floor, yet I was told the Manchu would twirl one of these ponderous affairs over his head and thrust and parry and fence and go through a variety of evolutions with great celerity. There were bows of immense size and stiffness and I got permission to try one. In my archery days I used to shoot with what is technically known as a 48-pound bow, that is, a bow which requires a weight of 48 pounds to draw the bow down the length of a 28-inch arrow. With all my strength and hands clutched to the bow and cord I could not pull it more than an inch. It was like stringing a telegraph-pole. A Manchu then took it and not only drew it up to his ear but back of his head and held it quivering in this position for several seconds. The bow was so heavy that an assistant immediately placed props under the archer's arms to support the weight while he drew it in this way. It would almost seem that an arrow shot from such a bow by such a giant in strength would have pierced a dozen elephants in line.



Drawing Heavy Bow, Canton.

The men who were drilling were Manchu Tartars on their way to fight the French in Tonkin, and as I made rapid sketches of them they seemed ugly and suspicious. Suddenly and without a word my Portuguese guide grabbed me by the arm and hurried me out of the room in a very unceremonious fashion, nor did he explain this urgency until we had got some way from the building, when he told me that what they had said made it very dangerous to remain there. Certainly by no act had they displayed any hostile intention, though they were chattering continually and were not very gracious in their actions.

While in Japan I had been greatly interested in the potter's art and made a study of their furnaces and the various devices used in their work. I looked forward with interest to the chances of comparing Chinese methods with those of the Japanese. Shanghai did not offer the opportunity, though the jars and flower-pots seen there in such profusion must have been made in the immediate vicinity. I was told that to see the art in its fullest development one would

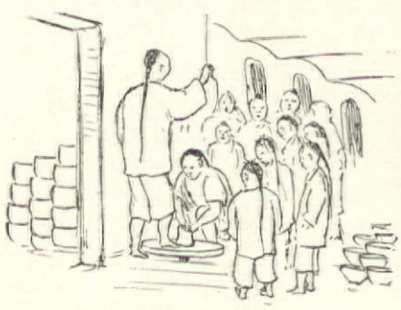
[1] Continued from No. 1380, page 78.

have to go inland 400 miles. At Canton my guide informed me that he knew of no potters' works near by, though bricks, tiles and earthen braziers were made in Canton and its neighborhood. There was a place up the river, about 30 miles, famous as a pottery-centre, but to go there safely, my landlord said, would require a passport, and this was only to be procured at Pekin. Of course there was no time to secure one, so to the American Consul I went, hoping that he might get a letter from some high official in Canton or from the Governor of the Province in which might be set forth the innocent object of my visit. But this could not be obtained; the Consul, however, informed me that only a few weeks before two Americans had gone up the river in a covered boat and on landing at the place had been mobbed, stoned, and driven to their boat, the sides of which had been smashed in, and even the Chinese magistrate who had endeavored to protect them came in for a share of the mobbing, and yet these men were not only provided with a passport from the Government, but with a letter from the American Minister. It is true these men were missionaries, and so I accounted for the rough treatment they had received. Not wishing to go alone, I tried to induce the Consul to accompany me, but official duties prevented; it was impossible to give up the trip, and with a feeling that if one behaved himself with becoming humility one might travel anywhere, I got my landlord to engage a boat with a crew of six men for the journey. A little Chinese boy who had waited upon me at the table and who knew a few words of English was allowed to go with me as guide as he said he knew all about the place. For the first and last time in the East I put a revolver in my pocket. The crew were a sturdy set of fellows, the boat was quite broad and flat-bottomed, and the men stood at their work facing the bow and pushing rather than pulling. The oars were very long and spliced, as one sees them in Japan. I sat in the bow with just room enough to avoid being struck in the face by the forward man; indeed, I had to be very careful in moving about, as the handle of the oar came within 6 inches of my head. We were five hours and a half going up the river and this against a hardly perceptible current. During the entire time of the journey the men never stopped for a single moment in their work, but kept it up with the greatest energy at the rate of thirty-two strokes a minute. It was a somewhat dubious adventure going into the country even this short distance at a time when the region was in a ferment over the French aggressions in the South.

In going up the river we passed one little settlement and then a village. The banks were low and here and there a solitary tree was seen, but the land on both sides was probably under cultivation and the people were too busy at work to saunter on the banks, and so a native was rarely seen. It was quite different on the river, for a large boat-traffic was in evidence, both in the vessels we overtook and passed and the vessels we met. Everywhere along the banks the earth seemed to be charged with old bricks, fragments of roofing-tiles, broken pottery and white porcelain, and this was certainly an indication that the river was bordered by dikes. There were no traces of river-jetties such as one so often sees in the rivers of Japan. It was curious to observe beyond the banks on either side of the river large sails slowly gliding along apparently as if the boats were sailing on the land. Our boat was so low and the dikes were so high it was impossible to see the land beyond, yet these large sails indicated, what every one is familiar with, the remarkable extent of the canal system in China. I was informed that a boat could go by canal from Canton to Pekin, a distance of 1,200 miles, with only one obstruction in the course — a mountain-chain. My experience on the river was anything but encouraging, for in every boat that passed us, and there were many, the occupants showed their hostile attitude by shouting "Fanquai" (foreign devil) and other vile epithets, and, what was more interesting, the men often making up the most hideous faces at me. To see a toothless, dirty old wrinkled Chinese stick out his tongue, contort his features and gesticulate in a threatening way was a new experience and a very unpleasant one. We finally arrived at the town at which the pottery was made. It stretched a long way on the river, and before we reached its southern border the banks were marked by huge dumps of broken pottery and porcelain, in some cases these accumulations forming conspicuous promontories jutting out from the shore. The banks also seemed filled with pottery, and here and there were tall cylindrical piles of wood, interspersed with piles of pottery such as have been already described at the city gateways in Shanghai. Here, indeed, was a pottery-town, but imagine my apprehension as to the treatment that might be accorded me after running a gauntlet of insults and hostile gestures for some 24 miles. If the boat's crew had only returned the epithets it would have been some assurance that I had at least six men as allies, but their cold and forbidding attitude showed very clearly that they endorsed the sentiments of the river population.

The place where we landed was covered with stacks of jars and pots of various kinds and I hoped that a pottery was in the immediate vicinity, but, on inquiry, my guide found that the pottery was at the upper end of the town, a place we might easily have reached in the boat. I then discovered that the guide had never been to the town and really knew nothing about it. However, there was no backing out now. The boat's crew had pulled out into the river, and the guide started ahead and I after him. I certainly did not relish going through the narrow streets with a hooting mob as an escort — a mob that had begun to collect the moment I landed. A troop of the dirtiest and raggedest hoodlums one could imagine started after us and ran ahead yelling "Fanquai" at the top of their lungs. Men joined this mob, some of them insolently thrusting their heads under the broad brim of my sun-hat and grinding their teeth at me; indeed, I believe that the looks of withering scorn and hatred can be better portrayed by a Chinese face than by that of any other race in the world. It was useless to make any friendly advances and so I did not attempt it, but looked as firm and defiant as possible under the circumstances, and kept one hand in my pocket holding on to a cocked revolver. I had already got one scare when I was so unceremoniously hustled out of a Manchu drill-room the night before, and, somewhat depressed by the treatment I had received on the river since early morning, this stern appearance I was assuming did not at all comport with my feelings. My little guide was in a complete funk, and I feared he would sneak off into the crowd and leave me alone. The boat's crew had pulled off into the middle of the river, for even they, though Chinese, came in for rough treatment, probably, for being in the employ of a foreigner. I went into a shop to buy a piece of pottery and the man looked deeply insulted by the intrusion. The extravagant sum I offered for a modelled bird, fresh from the oven, could not be resisted, and I brought back with me a single trophy of my adventures. We had gone over a mile and passed large shops of pottery, but no sign of its manufacture. The guide frequently and timidly inquired and was told to go on. Mr. Drew, at Shanghai, had informed me that the potters were a rough class compared to others, and my landlord had told me that I was to visit a region from which most of the Chinese came who landed at San Francisco and to which region they returned with stories of the heartless cruelties and indignities they had received in a Christian country, the persecutions coming from a class whose religion is most widely presented by missionaries in China, the Catholics. I could not wonder, then, at my reception. The streets were very narrow and literally stinking; the crowd increased in number and turbulence; boys ran far ahead to tell their people that a foreign devil was coming up the street. It reminded me of the way boys run ahead of a circus, and a circus it was, and I would have been gladly out of it.

Finally, and to my great relief, we turned up a narrow alley, followed by the howling mob of roughs. The alley led directly into a pottery. The potters left their work as they heard the racket, and so when I entered the place work had ceased, and a number of rough and savage-looking potters surrounded me with angry and inquiring looks. I made my way through the crowd, found a potter's wheel and made gestures to a man, evidently the boss, that I wanted to see how they turned a pot, and the sight of a fee that was probably equal to a month's wages induced him, without an expression of thanks, to shout to a fellow to go to work. I was at last to see the working of a Chinese potter's wheel. I crowded back the mob, stepped on a naked toe now and then, and fairly bluffed myself into a place where I was enabled to make a hasty sketch of a potter at work. The wheel rests on the ground and the potter squats beside the wheel. A helper stands near by steadying himself with a rope that hangs down from a frame above; holding on to this and resting on one foot he kicks the wheel around with the other foot. The potter first puts sand on the wheel, so that the clay adheres slightly. He does not separate the pot from the wheel by means of a string, as is usual with most potters the world over, but lifts it from the wheel, the separation being easy on account of the sand previously applied. The pot is somewhat deformed by this act, but is straightened afterwards with a spatula and the hand, as was the practice of a Hindoo potter whom I saw at Singapore. The ovens were like those of the Japanese; they were built in a much more substantial manner, however. The roof above them was well made and supported by brick columns. In this pottery there was not a sign of a green leaf or flower; it was as barren as a brickyard. What vivid memories came back of the Japanese potter with his charming surroundings, the offering of tea and cake, the children in the neighborhood bowing as one passed, the potter himself, a courteous soul with a love and knowledge of his craft and the work of the generations preceding him. In contrast, this Chinese pottery in a desolate yard, the ground strewn with pottery fragments, a number of workmen shouting to each other or at me, a horde of ragged men and boys howling vile names, and I thought of my long walk back through the city followed by this venomous mob of thoughtless brutes. I no longer wondered that magistrates could order these people to be beheaded by hundreds without a quiver of feeling, and, at the moment, I should have enjoyed the ordering of such a performance and might have witnessed it with equanimity. By their disputes and gestures it was evident that they could not understand the reason of my visit. That a barbarian and foreign devil should hire a boat's crew of six men and a guide and come all the way from Canton just to see a pot turned was simply preposterous and I must be a spy. A shout of contempt went up when I turned my back on the pottery and started down the narrow lane. The crowd kept up such a yelling that my approach was signalized far ahead, so that I passed through a serried array



A Potter at Work.

of frowning and angry faces. It was a relief to find that my boat's crew had not deserted me, but hearing the uproar had pulled in to the landing and was ready to row out the moment I got aboard. As we pulled into the stream a salute of contemptuous shouts and a few stones followed us. Why they had not assailed me and smashed the boat I could not understand, unless they had noticed that one hand had been in my pocket all the time, through which the outline of a rather heavy revolver might have been detected. We pulled across and down the river some distance and running the bow ashore I prepared to eat my lunch, feeling a great relief in having left the Chinese devils behind, when a number of shadows fell across me and looking up I found the high embankment fringed with a lot of peasants, men and boys, who began jeering at me. These twenty or thirty seemed so harmless compared to the hordes in the city that I felt bold, took out my sketch-book and began to set them down. This act instantly frightened most of them away, evidently disturbed by some superstition in having their pictures taken. A few men remained and defiantly made up faces at me and jerked their arms in a peculiar gesture which the guide said meant to choke me.

If one soberly considers the manner in which the Chinese have been treated by Christian nations he cannot be surprised at the attitude of the Chinese towards him. In the plainest way it may be stated that the "Foreign Devils," under the guise of a diplomatic phrase known as "spheres of influence," have stolen thousands upon thousands of square miles of territory, have robbed them of nearly every open port and have extorted untold millions in indemnities.

It was a relief to start for Canton and leave these justifiable ruffians to their filth and superstitions. On our way down the river we landed at a village which my guide said was the home of his family. He did not find a relative even, and it is probable that some ancestor

Gateway of Village.

lived there many hundreds of years ago, for such is their way of inaccurate statement that it is often impossible to find out what they do mean. (This is stated on the authority of Dr. Smith in "*Chinese Characteristics*.") We entered the village by one gate, passed through the place and out by another gate. The village being an agricultural one, the men, women and children were in the rice-fields at work, so there were few to greet me, hostile or otherwise. It was curious to see at this city-gate conveniences for burning incense to propitiate the evil spirits and bring good luck to the community.

The single trophy I brought back from the pottery-town shows fine taste and skill in modelling. In this town I discovered the origin of the common brown and green glazed pottery figures that one finds for sale in our country; figures that are more curious than beautiful and sell for a few cents. I secured one of these in Canton and have in my possession a figure which had been handed down in an old Salem family and is known to have been brought from Canton over one hundred years ago. It is made of precisely the same clay and glaze as the modern one just alluded to and must have been made in the same place. The fragments of pottery jutting out from the river-dikes were also of the same material, so that from time immemorial a succession of generations have continued making the same pottery; an illustration of the fixed and unchangeable character of these people. The interesting fact about these figures is that the modern one shows a marked deterioration in the art — a change that is seen in Japan as well as in other regions of the world.

I got back to Canton late at night wearied with the strain and anxiety of the day's adventure. In my brief experience in Canton I could not recall a single friendly or approving look, not a sympathetic return of a smile that even the lowest savage will respond to; on the contrary, a contempt and hate of me was everywhere manifest. In a Japanese town in a single day's sojourn I would establish kindly relations with a number of men and children who would come to the borders of the village to bid me good-by. At one place milk was sent to me every morning by some one who knew that the foreigner drank milk; at another place some little souvenir was given me by the servant of some one just as I was about riding away. I wanted to see the good points of the Chinese, but utterly failed to get in touch with any one save my companions at Shanghai, who had lived in Hartford for a few years and had, doubtless, been slightly affected by this foreign contact. Artificial as the politeness of the Japanese is said to be by some English writers, I recall the expression of one who said that politeness was like an air-cushion; there was nothing in it, but it eased the jolts wonderfully. In my short experience with the Chinese I do not recall the faintest indications of kindliness, politeness or urbanity; whether high or low in station, their attitude was always the same. Now, I know there must be kindness, gentleness and politeness among them. In the higher classes etiquette is developed to a degree unknown with us.

The reception a foreigner encounters in China is due to an intense dislike of us, coupled with an absolute contempt for all we do and for all we have accomplished. It seems strange that the cheap crowd of Chinese who come from the poorest regions around Canton and follow the menial occupation of washing clothes despise us and all that our civilization has acquired. They burn our gas and kerosene, ride in our cars, profit by our medical practice, appear in our public courts for justice, follow time with a Connecticut clock, use our mails, yet look on their own ways as infinitely superior to ours in every respect. They are, undoubtedly, deeply impressed and flattered by the fact that in some matters we imitate them. If they are taught history in our mission-schools they know that many of our arts originated in their own country. The art of making paper, printing, the mariner's compass, the manufacture of gunpowder, white porcelain and silk are all due to the Chinese. They further note the use of raised beds, tables and chairs, and probably laugh at our limited use of the wheelbarrow, which, with them, conveys passengers as well as merchandise. They notice the same activity and bustle on the streets, our food is in many respects not unlike theirs, and they go to our markets and without trouble find articles of food to their means and taste, and they observe their national drink dividing the honors with coffee. They further notice that, like their own people, we love noise, and in this matter they probably regard us as superior in that our barbarous factory-whistles wake up invalids in the next county while their racket may reach only a few squares. The factory-whistle and the grinding trolley-car with its clanging bell they delight in and we make no effort to suppress. Their pride must be flattered, too, when they discover that we celebrate our great national birthday precisely as they celebrate their great days and, what is more, we send to their country for the fire-crackers with which to do it. If our people die in any part of the world the body is transported across continents and oceans to be interred in home burial-places. The Chinese transport their remains in the same way to their native country.

In recognizing these similarities they see an approach to their own people, but beyond these matters they are totally blind. Cleanliness, sanitation, good roads and schools, coinage, postal-system, fire-apparatus and all the wonderful development of steam and electricity and the thousand instrumentalities of life that we have acquired through the persistent study of the behavior of nature's laws make no more impression on their brains than it would on the brain of an ox. In that respect they represent a savage race.

EDWARD S. MORSE.

A CRITICISM OF THE SHAW MONUMENT, BOSTON.

IN his book entitled "*The Field of Ethics*," George Herbert Palmer, Alford Professor of Philosophy in Harvard University, treats of the relations between ethics and æsthetics, and in illustration of the kinship between certain traits of beauty and goodness, he gives the subjoined description and estimate of St. Gaudens's Shaw Monument:

"In seeking for a beautiful object which I may fairly assume to be widely known, what can I select better than the wonderful bronze memorial which stands on Boston Common, opposite the State House? All of us are familiar with it, — the Shaw Monument, — and we all feel the sublimity of its motive. It represents a subject race moving towards freedom, seeking that freedom by its own exertions, yet under the guidance of a people more developed than itself. This complicated and exalted motive is made by the artist to address the eye. As a work of art his picture appeals to us not merely through its sentiment, but by the entanglement of this with certain experiences of vision. Visual pleasures of a peculiar sort are made to fortify patriotic emotion. What, then, are these visual pleasures and how are they adjusted to stir our sense of sublimity?

"First, there is rhythm. This multitude — a dozen or more in the foreground, suggestions of an indefinite troop behind — is no mere multitude. It is bound together by harmony of answering lines, and gives to the eye such concord as measured verses give the ear. Then there is its typical character. These men are negroes. The strange and half-formed faces, the large and awkward feet belong only to one race. There is no feature which is not distinctive of a specific people, and all the kinds of man which could enter into a racial army are here represented. Here is the drummer-boy, young, eager for

the fray, delighting in adventure. Here the man of vigorous years, performing his duty with cheerful stoutness, not thinking too much about it or himself. And here the aged man, whose great opportunity has come after a life of waiting.

"Inclusive, therefore, as the piece is, we feel it to be one, however minutely its details are inspected. How united, for example, are its lines of motion. The end which this race seeks is not yet attained. But half-men yet, their goal is ampler manhood. It lies ahead, and towards it every line converges. To these resistless marchers those words of Shakespeare apply, by which he described the minutes of our life: 'In ceaseless toil all forward do contend.' Everything here contends forward. The very slope of the muskets, though never allowed to become mechanical through parallelism, beats out the same reiterated impression — the impression of onward movement. There is no portion of the figures too unimportant for the artist to have studied with this in view. He has related his soldiers' legs, has harmonized their feet; and as these rise on the toes, all their ungainly curves combine to emphasize the forward swing. Spontaneous as all appears, not an ill-adjusted heel can be discovered, no part which is not in some way called to make concord with its fellow-part.

"And if there are features of the composition which might at a first glance seem to jar its chief lines, these will be found on closer study to confirm the ocular argument. Thrown out a little from the rest — they a troop of trudging negroes, he the most refined of white men — sits an officer on his horse. The horse is lightly reined, and the harsh curve of his neck and body breaks the lines of the piece and throws this part of the composition out of full concord with the surroundings. But is not the detachment needed? Does it not reënforce both thought and visual pleasure? Contrast is involved in the subject, and perhaps this jarring of the dominant lines heightens their effectiveness. And then how beautifully the multitude is once more united and its community of aim displayed in the floating Victory above! Hardly noticed by the moving figures, she sweeps over them in her trailing robe, welding all together and assuring their common end.

"When we try to sum up our general impression of the beauty of this monument, I think it will be found in its exceeding harmony. In it there is nothing superfluous and nothing lacking. That is its striking characteristic. If any doubts visit our minds about its perfect beauty, they take the form of pointing to something in it which does not quite go with the rest. Is the figure of Victory rather long? That is to ask whether it is truly proportioned to its surroundings. Does it attract attention to itself, or fix attention on the whole composition? We may think the horse of Colonel Shaw a little too natural, and condemn him for backing too much as a real horse would. If so, we judge that the lines of the creature detach themselves too palpably from the rest of the composition and do not assist, as they should, to confirm human action. That is, in criticising the piece and deciding whether it is singularly beautiful or a worthy work with blemishes, we scrutinize its concord and ask how fully it is organic, whether each part in it is demanded by every other part. If nothing capricious appears, if the single portions, however minute, have been dictated by the law of the whole, then of course we count it beautiful. If we think we can detect any portion which sticks out, hangs off from the rest, and claims attention for itself, then we say that in this respect it fails.

"But is it true that no one can enjoy the Shaw Monument without going through some such analysis of its beauty as I have given here? Far from it; such analysis is quite as likely to hinder the enjoyment as to help. We have approached the matter as students of beauty, trying to bring its elements distinctly into consciousness. But that which makes a beautiful work of art most beautiful is that it calls for no distinguishing consciousness. The separate parts are not specifically observed. The total makes a single impression. The work of art appeals not to intellectual verification. It reaches the unity which should characterize it only when it can be grasped at once by momentary feeling. So long as it is necessary to go over it piecemeal and say, 'This single part accords with that single part and with the other single part,' we may be sure the result is flabby. If the work were really coherent, it would say so at a glance. The crowds who pass before that august bronze and feel the sting of its beauty do not know that they are impressed by congruent features, rhythmic figures, almost parallel muskets, lines of uplifted heels, and converging curves. With no such things are they concerned. To notice these is to disparage the total beauty. By the artist these things are studied before the beauty is born; by the spectator, when the thrill of it is a little passed by.

"We may probably conclude, then, without search for supplemental elements, that this principle of organic wholeness is a central characteristic of the beautiful object we have been examining. And is it not also a beauty everywhere? In a beautiful piece of music there are no accidents. Everything falls there by appointment, nothing by mere happening. The whole demands every note that sounds, and no phrase could have differed from what it is. The case is the same with beautiful writing. When our essay or story turns out badly, it is because we have put in matters which were unnecessary or have omitted what the reader would really need to know. The parts straggle or do not go entirely well together, and in consequence the piece is not integral, solid, firm in texture. It is true my examples have thus far been drawn from the field of the fine-arts — that is, from beauty humanly constructed. But where beauty is an affair of nature and not of conscious construction, its principle is the same. In a beautiful human body 'head with foot hath private amity.' In calling a landscape beautiful, I mean that it possesses such harmony of lines and colors as would have been placed there by a conscious artist. Its easy wholeness is just what an artist labors to produce."

ON COLORED WAX STOPPINGS.[1]

MOST papers begin with an apologia — a disclaimer of authority on the part of the author — an appeal for indulgence because of the writer's youth, or age, or lack of time, or literary inability, or what not; and I have no wish to depart from a form which at least is founded upon experience and the survival of apologetic paper-readers. We all hope that modesty may mollify our audience and that we may have the good fortune to really meet and talk to the "gentle reader" whom our forefathers used to woo in their urbane prefaces. Accordingly I apologize for this paper — a paper which really is better described as a practical note, and a practical note, moreover, on the simplest form of inlay in wood — namely, colored wax stoppings.

The dictionary tells me that "inlay" consists of "pearl, ivory, choice woods, or the like, inserted in wood." Well, you cannot compare colored wax stoppings with such inherently beautiful materials as "pearl, ivory, or choice woods," therefore you must accept simplicity of material in the means at your disposal; at the same time, you may be reminded that fine results have been achieved in the past by these simple means, and so it may be worth while to recall attention to a form of inlay which has fallen into neglect.

If any one will go to the Victoria and Albert Museum, in one of its darkest corners he will see a number of *cassones*, old chests, covered with incisions and carvings. These chests have been filled-in with colored wax. On the oldest, which dates back to 1530, a certain amount of color still remains in the incisions, and where the color has come out, from its being incised, it still tells quite firmly, as designed. What were these *cassones*, and how were they done? So far as I know, they were the wedding-gifts of fairly well-to-do people to the bride — at least from the parents to the bride. They held her costumes — her trousseau. On the outside of them were carved romantic allegories, as was quite fitting in a piece of furniture that had so romantic an origin. You wonder how this was done. When you look a little closer you find that the work is incised, and that the incisions have been filled-in with colored wax — green and red wax as a rule. They had three ways of expressing their design in this method; it is either done by spaces of color silhouetting the figures, or else it is done by lines, or it is done by spots — and in the lines and in the spots you will find nearly all the stopping has vanished; but in the larger spaces you will see that the stopping has remained fairly firm — for 500 years. I attribute that to the fact that the larger spaces would be got out with small gouges and chisels, and that therefore there was a key at the bottoms; and that where the lines and spots came it was with the blade, just cut down like engraving, and that there was no key in the bottoms in those lines, so that in time the stopping came out. That has been the case. But I think that you will be surprised to see how beautiful the thing still is; it has faded, yet it still possesses the bloom of its early beauty. You feel what a beautiful thing it is. It is not the least like a painting, part of which has been effaced, and which always has a look of disease — an appearance of something or other gone wrong; but this merely looks a little faded. Just as in another art altogether — the *carillons* of Bruges — although some of the bells are wanting, they still sound extraordinarily beautiful, with that dim misty sound of broken air. So in these old *cassones* there is a broken air of melody in the design that still remains a thing of beauty, although the wax colored inlay has gone.

These old examples show what fine things can be done in this method by artists who understand the graphic possibilities and the limitations of flat surface-decoration.

About fifteen years ago, urged on by admiration of these old examples, I made several small experiments in this method, and as I have been asked by the Council of the Royal Institute of British Architects to give the results of my experience — which has now stood the test of some time — I am glad to repeat the methodical notes which I contributed on this subject to the July number of the *Art Journal* last year. First trace your design on the panel of wood to be incised; cut it, either with a V-tool or knife-blade fixed in a tool-handle; clear out the larger spaces with a small gouge, leaving tool-mark roughness in the bottoms for key; when cut, stop the suction of the wood by several coats of white hard polish. Your colored stoppings you must make. Resin (as white as you can get it), beeswax, and powder distemper color are the three things needful, and "*Spon's Workshop Receipts*" will put you into the right way of making your stoppings — with this reservation, reduce the proportion of resin, as this tends to make the wax over-brittle. For running the melted wax into the incisions — that is, for the inlay — I have made use of the small funnel with handle and gas-jet affixed which I have here: by means of india-rubber tubing it is attachable to the nearest gas-burner, and thus a regulated heat can be applied to the funnel. When thus attached and heated drop pieces of wax of the intended inlay color into the funnel, and soon there will be a run of melted wax dropping from the end of the funnel-spout, which is easily guided by means of the wooden handle, and thus the entire panel may be inlaid with the melted wax. When this is all done

[1] A paper by Heywood Sumner, read before the Royal Institute of British Architects, and published in the *Journal* of that Society.

clear off the superfluous surface wax with a broad chisel so as to make the whole surface flush, and then, if you have rightly stopped the suction of the wood by the white hard polish, your panel should all tell with clean sharp contrast of flush wood-lines against colored stopping surface, color stopping lines against wood surface: if the suction is not stopped the hot wax will enter the grain of the wood and stain it.

I have also filled-in incised panels successfully with japanner's gold-size and powdered distemper color, using a palette-knife to distribute the slab mixture. This sinks as it hardens, and will probably need a second filling-in to make it a flush job.

In both cases, I should add, the stopping has proved durable and tenacious, but the melted wax gives a more interesting and accidental result, and is better suited for designs that depend on spaces of color-stopping for their effect.

Individual preference will suggest the wood to be used for this work, a close grain being the one thing needful. The specimens I have brought here are lime, birch, and a box of *kauri* pine. The last you will see is not sufficiently close-grained and is slightly wax-stained in the inlay, but it was made where choice of woods was limited. As to design, that which is suited to this sort of inlay may be compared to a broad sort of engraving. The lines must be wide enough to hold the wax and the spaces of color must have occasional ridges — like cloissons — in order to hold the wax and to keep the flush surface of the panel when the chisel shaves it down; but within certain limits, which must be felt, the manner of design is more free than is the case with inlay composed of veneers of hard material; and the absence of beauty of material — *e. g.*, pearl, ivory, or choice woods — must be forgotten in the beauty, fancy, and austere freedom with which the incised decoration is expressed. Certainly, I think that the specimens which I have spoken of in our Museum show all these qualities of design — beauty, fancy, and austere freedom of handling — and accordingly I cannot do better than to urge the claim of these old relics to be studied both for method, application, and romantic design of colored-wax inlay in wood, and to hope that others may be fired with the desire to further experiment in this simple method.

As to its application, I will not suggest beginning with results — with such fine results as the old examples to which I have called attention, but will turn to real homely requirement, from which a more stately application might arise. I think that we have in our time lost a number of nice little simple household things that our forefathers used to enjoy. Our grandmothers, when they made tea, used to have a tea-caddy. They had a nice tea-caddy with delightful inlay. Where is that tea-caddy gone? We drink more tea than ever, but the tea-caddy has departed. Then some of us smoke cigarettes, but the cigarette-box makers do not seem to care to use this process of inlay. Again, when I was at school I had a nice brass-bound desk with a secret drawer in which I was always hoping to find money. Those are quite things of the past. When I send my boy to school, and ask for a desk, I get a deadly dull thing with a lump of brass in the middle, that a boy, if he tried with both hands, could not get fond of. Then, again, clocks. Just think of the beauty of a clock-case. We all want to know the time nowadays, and we bustle more than ever; but for modern artistic clock-cases there seems very little demand. There is a demand for chiming clocks — why I do not quite know, since they are maddening things. But no one seems to crave a stately clock that will make him feel a better sort of man! This qualification is very true, for if you have a fine thing in your house you try to live up to it. There is another neglected thing, the barometer. It seems odd to me that so admirable an instrument has never suggested fine craftsmanship to the imagination. Why should not craftsmen in inlay give us these quiet, homely things that we are always needing and using? If anything I have said to-night were to turn our really skilful cabinet-makers — the men who understand the whole mystery — to this simple side of the craft, I should feel that I had done a very good evening's work.

THE UNDERGROUND PASSAGEWAYS OF ENGLAND.

THERE are, however, numerous traditions of other achievements of underground architecture which are not altogether, or at all, unauthentic. There is the often-talked-of passage from Highgate or Hampstead to St. Albans, invariably associated with the redoubtable Dick Turpin. Certain traces are said to have been found, and of the many hazarded explanations perhaps the most plausible is that which suggests that it was the commencement, in Roman times, of an enormous military work between London and Verulamium. There was said to be an underground passage in connection with Sir Thomas More's house at Chelsea, though neither its destination nor dimension seems to be known. Tradition asserts, too, that there was a similar way from the Tower of London to the Old Palace at Eltham; and a less shadowy authority declares that it was from a subterranean passage at Hampton Court that Charles I effected his escape from the jailership of Colonel Whalley. Relating to the other principal actor in the grim drama of rebellion and regicide is the tradition of an underground passage from Cromwell's house at Westminster, and readers of Dumas will not forget the effective use he makes of this belief in "*Twenty Years After*."

It is only natural that many of these traditions of underground passages and dwellings should associate them with religious houses or churches, the obligations of sanctuary, the political importance of ecclesiastics, and the fluctuating relations between Church and State, making secrecy of transit and abode often absolutely essential. There was the alleged subterranean communication between Southampton and Netley Abbey; another between Warwick Castle and St. John's Priory; another between the Castle and Priory at Lewes. From the famous Abbey of historic Tewkesbury there ran, it was said, a passage underground to Malvern — possibly to the monastery founded there by the Confessor.

From Durham Cathedral, "half Church of God, half tower against the Scots," the monks could pass to the beautiful Abbey of Kirkstall; from the stately Benedictine Church at Reading, whose massive walls, 8 feet thick, had a circumference of half a mile, a similar passage ran, so the story goes, to Caversham.

When any of the mighty Nevills, Lords of Middlesham, needed ghostly counsel, it was said that a confessor could come, all the way underground, from the distant Abbey of Gervaux; and the Percys or Seymours of Wressil could in like unseen manner attend mass or evensong at Howden Church, 4 miles or more away. The pious nuns of Watton, concerning whose rigorous discipline Fosbroke relates so many quaint particulars, were wont, tradition said, to attend at the Holywell at Kilnwick, and there perform miracles of healing.

But what doubtless seemed the greatest miracle of all was, how they got there, till the mystery was put an end to by the discovery of a subterranean passage to the nunnery. From Guisborough Priory a tunnel ran for a mile and a half to a place called Toccotes, and in the midst of this, so we learn from Ord, was a mighty chest of gold. Easy enough to be plundered, it would seem, since its only guardian was a raven — but this raven, like Poe's,

> Had all the seeming
> Of a demon that is dreaming,

and when any venturesome wight approached with felonious intent, the seeming came true and the dreaming ended, and the Foul Fiend himself stood revealed. There was a passage, the old books tell us, between Someries Church and St. Mary's, Luton, and another from Newnham Abbey to the priory at Bedford, some 2 miles distant. This appears to be fairly well authenticated, and perhaps the same may be said of the tunnel between Larkbeare House, in Exeter, to the castle and cathedral, and of that between Sawley and Whalley Abbeys in Yorkshire, stated to have been 7 miles long, and of which traces are said to be found. Intervening water was as little of an obstacle in those days as now, always assuming the existence of these reputed passages.

From Pontefract, for instance, a tunnel was said to run under the moat, and have its exit at a mound a mile distant; and from Richmond Castle a similar passage led to St. Martin's Priory, on the other bank of the river Swale. Still more staggering are the legends which affirm a submarine communication between the Giant's Causeway and Rathlin, a distance of 8 miles, and between the coast of Wigtonshire and the Isle of Man, about 30 miles. These find their parallels in the legendary passage from Naples to the Castle d'Elmo, and that convenient tunnel, 4 miles long, which led from the mainland to the delightful island of Capri. But there is nothing new, more especially in the way of underground architecture, and we need not, accordingly, be astonished at reading that ancient Egypt boasted its subaqueous passage between Assuan and the island of Elephantine. — *London Times.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

CORRECTION. — Owing to an unfortunate mixing-up of proofs, there was published last week under this heading the title of the Birmingham University, an illustration which was not actually contained in the issue. The plate which ought to have been entered as among the illustrations was the Prince Regent's Theatre at Munich.

THE UNITED STATES COURT-HOUSE AND POST-OFFICE, SALT LAKE CITY, UTAH. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

EXTERIOR DETAILS OF THE SAME.

THE BIRMINGHAM UNIVERSITY, BIRMINGHAM, ENG. MESSRS. ASTON WEBB AND E. INGRESS BELL, ARCHITECTS.

THIS plate is copied from the *Builder*.

[The following named illustration may be found by reference to our advertising pages.]

THE VILLA HOFMANN, MANNHEIM, BADEN.

THIS plate is copied from *Architektonische Rundschau*.

NOTES AND CLIPPINGS

BLASTING-RIGHTS ON MANHATTAN ISLAND. — Justice Giegerich of the Supreme Court has refused to continue an injunction granted to Maria del Carmen Santos de Carvajal, the owner of the premises at 214 West Twenty-fourth Street, restraining the Young Men's Christian Association, and Canavan Brothers, the contractors, from blasting in an excavation adjoining the plaintiff's premises. The latter claimed that the blasting was seriously endangering the safety of her building. The contractors answered that the work was being done with the utmost care, and pointed to the fact that no damage had been done by them to other buildings similarly situated, where the work has been completed. The plaintiff based her case on a decision of the late Justice McAdam that the owner of a house erected upon a stratum of rock extending through adjoining premises may enjoin the owner of the adjoining premises from blasting the rock, where the blasting, even if conducted with the greatest care, would cause serious injury to the house. (Brennan *vs.* Schreiner, 28 Abb. N. C., 481.) Justice Giegerich holds that this case has been overruled by the Court of Appeals in Booth *vs.* Rome, Watertown and Ogdensburg Terminal Railroad (140 N. Y., 267), where it was said: "The rocky surface of the upper part of Manhattan Island makes blasting necessary in the work of excavation, and unless permitted the value of lots, especially for business uses, would be seriously affected. May the man who has first built a store or warehouse or dwellings on his lot, and has blasted the rock for a basement or cellar, prevent his neighbor from doing the same thing when he comes to build on his lot adjoining, on the ground that by so doing his own structure will be injured? Such a rule would enable the first occupant to control the uses of the adjoining property to the serious injury of the owner and prevent or tend to prevent the improvement of property. The fact of proximity imposes an obligation of care, so that one engaged in improving his own lot shall do no unnecessary damage to his neighbor's dwelling, but it cannot, we think, exclude the former from employing the necessary and usual means to adapt his lot to any lawful use, although the means used may endanger the house of his neighbor. It (the blasting) was not an act which, under all circumstances, would produce injury to his neighbor, as is shown by the fact that other buildings near by were not injured. To exclude the defendant from blasting to adapt its lot to the contemplated uses, at the instance of the plaintiff, would not be a compromise between conflicting rights, but an extinguishment of the right of the one for the benefit of the other. This sacrifice, we think, the law does not exact. Public policy is promoted by the building up of towns and cities and the improvement of property." — *N. Y. Times.*

THE "RIGHT OF WAY" AT STONEHENGE. — There are few privileges of which the rural population of England are more tenacious than those of right of way. Any attempt to close an old footpath, even if unused and almost forgotten, at once precipitates a fight. A question of this sort has now arisen in connection with the venerable ruins of Stonehenge. A year ago Sir Edmund Antrobus enclosed Stonehenge with a barbed-wire fence, and imposed a charge of one shilling for admission to see the monument. The immediate object was to protect the stones and raise funds for certain works of restoration and exploration. But the effect was to deprive the nation of free access to a national monument. Not unnaturally, therefore, the question at once arose whether the enclosure was lawful. There seems to be no doubt that Sir Edmund has become the possessor of the land on which the stones stand, but it is equally certain that the public have always enjoyed the right of free access to them. One fact alone is sufficient to prove the antiquity of the footpaths. The outermost circle of Stonehenge consists of an earth vallum worn down by time and weather, but still rising some feet above the natural surface of the ground. The paths in question cut through this vallum, which rises abruptly some three feet or so on either side of them. In other words, so persistent has been the use of the roads that it has gradually worn away the earth where the circle is crossed until it has brought the surface to the natural level of the ground. The whole matter is under investigation by the local County Council. One fact of singular interest has been elicited. There seems to have been a special gathering every year, numbering thousands of persons, at Stonehenge to witness the rising of the sun on the 21st of June. As Stonehenge, according to the best opinions, was originally constructed with reference to rites performed at this very moment, it is supposed that there has been a public assembly on Salisbury Plain at midsummer ever since the circles of Stonehenge were first completed. — *N. Y. Evening Post.*

A FEAT OF BRIDGE-BUILDING. — The double tracks of the Pennsylvania Railroad cross the Schuylkill River at Girard Avenue, Philadelphia, on a stone-arch bridge with a single steel-truss span over the middle channel. This was recently replaced in 15 minutes, without the least delay or interruption to the almost continuous traffic of long, heavy freight-trains and high-speed expresses which cross the bridge every hour in the twenty-four, without obstructing the river. A temporary steel span was built alongside the old one and at a lower level, so that its top was a little below the bottom of the old structure. On this was erected, in the usual way, the complete new span with the tracks laid on it. Powerful hoisting-engines were set on platforms at the ends of the old span on the opposite sides of the bridge, and operated four sets of tackle, by which, after the tracks had been cut, both spans, weighing together nearly 2,000,000 pounds, were pulled sidewise on double tiers of long horizontal rails with over 300 solid steel rollers between them. In this way the old span was displaced by the new one, which followed it like a very substantial shadow, until permanently seated in exactly the same position. Two and a half minutes after the last train crossed the old span, the connections were broken, the engines were started, and in 2½ minutes more had pulled both spans simultaneously the full distance of about 37 feet. In 8 minutes more the first train had passed over the new span, and it was in regular service. The engines and tackles were shifted, and a set of greased rails was arranged at a low level, on which the temporary span was pulled to a position directly below the old span, and served as a support while the latter was taken to pieces. The great weight of the spans, the difficulties from incessant traffic, and the speed and accuracy with which the spans were moved, make this one of the most remarkable of feats. — *Frank W. Skinner in the June Century.*

CONCHOLOGY AND SPIRAL STAIRS. — One of the most remarkable architectural structures in existence is the left-handed spiral staircase in the Château de Blois, Touraine, built during the sixteenth century from designs by Leonardo da Vinci. In the May number of the *Monthly Review*, Mr. Theodore Cook shows that the design of this staircase corresponds so exactly with the spirals on the common Mediterranean shell known as *Voluta vespertilio* as to leave little doubt that the artist had that shell before him as his model. The spiral on the central column of the core of the staircase corresponds exactly, for instance, with the spiral ridges on the *columella* of the volute, as seen in section. This of itself would be strong, although perhaps not absolutely convincing, evidence as to the origin of the design. But the staircase has also an exquisite outer balustrade, which shows a correspondence to the coils on the external spire of the shell as close as that which obtains between the interior of the staircase and the *columella* of the volute. Such a dual resemblance could scarcely be the result of coincidence, and the author seems justified in the view he has taken. It is remarkable, however, that the spirals in the staircase run in the reverse direction to those in normal examples of the shell, that of the central shaft being left-handed instead of right-handed. The spirals are, in fact, those of a "reversed," or dextral, example of the shell, of which, perhaps, one in a million occurs in nature. That Leonardo da Vinci had such a reversed shell from which to copy is unlikely; but it is known that he was left-handed, and a left-handed man would naturally draw a reversed spiral. The author has in hand a work on natural spirals in general. — *Building News.*

WHITE ONYX DEPOSITED IN ARIZONA. — A very large deposit of white onyx has been found in the Baca land-grant in Yavapai County, recently purchased by an English syndicate. One of the specimens, weighing 50 pounds, is of solid creamy white. The deposit is said to be the only bed of white onyx known. It is without a flaw or crack. The vein is 5 feet thick, extending 800 feet in one direction and 1,000 in another. It is covered by 250 feet of limestone, which probably accounts for its freedom from cracks, flaws and discolorations. Slabs of almost any marketable length can be taken out. — *Exchange.*

CHARACTER OF THE DEPOSIT UPON ST. PAUL'S. — Under the coping of the balustrade surrounding the Stone Gallery at the base of the dome of St. Paul's, in London, is a black deposit about three-fourths of an inch in thickness. This deposit resembles boiler-scale, and it has lately been subjected to chemical analysis to determine its nature. The analysis reveals the curious fact that it is a sulphate-of-lime, or gypsum, and it is assumed by the chemists that it was deposited by the air. Their argument is that in two hundred years the smoke and gases from London chimneys have charged the rains with sufficient sulphurous and sulphuric acids to make this deposit. — *Boston Transcript.*

THE FORESTS OF RUSSIA. — The gradual deforestation of Russia is attracting increased attention throughout the Empire, and the Forestry Society as well as the Forestry Department of the Ministry of Agriculture and Domains are discussing means for regulating the consumption of timber and for propagation. There does not seem to be any great cause, however, for apprehension, as a recent official report states that forests in Russia now cover an area of 188,000,000 hectares (464,000,000 acres). Among European countries, Sweden comes next with 44,000,000 acres of forests. In Russia the forests cover 36 per cent of the whole area of the country. The Swedish forests occupy 44 per cent of the total area, and the Austro-Hungarian 32 per cent of the territory of the dual monarchy. Reckoned by the population there are 4.9 acres of forest to each inhabitant of Russia, 9.5 acres in Sweden, 10.4 acres in Norway, and .69 acre per head in Germany. The forests have a greater importance for Russians than for people of Western European countries, as villages and country-houses are largely built of wood, stone and brick houses being almost unknown, and the forests furnish the main sources of fuel supply. — *Journal of the Society of Arts.*

A LARGE CRANE. — German papers claim that "the largest crane in the world" is to be seen in use at Kiel. Its own weight is 450 tons, and it is capable of lifting as much as 150 tons. Its arm stretches 50 yards from point to point, and is 50 yards and more high above the foundation. It is worked by electricity. — *Exchange.*

THE RESTORATION OF THE ERECHTHEUM. — The Greek Archæological Committee has decided to restore the Erechtheum. The greater part of the famous ruin on the Acropolis is still standing, and the fragments necessary for its complete reconstruction are all lying around. — *N. Y. Evening Post.*

A JAPANESE SLEEPING-CUSTOM. — The Japanese never sleep with the head to the north. This is because the dead in Japan are always buried with the head in that position. In the sleeping-rooms of many of the private houses and of hotels a diagram of the points of the compass is posted upon the ceiling for the convenience of guests. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, JUNE 21, 1902 No. 1382

CONTENTS.

SUMMARY: —
The increasing Fire-Tax and the Inequality of Insurance Premiums. — Warehouse Fires in the Barbican, London. — Inferiority of English Methods of Building. — Condition of the Smaller Industries in Germany. — Lowering the Grade of Mill Operatives and the Result. — Industrial Combinations in the United States and Abroad. — A Porous Nailing Brick. 89
THE GENIUS OF MICHAEL ANGELO. 91
LETTER FROM PARIS. 93
BOOKS AND PAPERS. 94
INCRUSTATION ON ST. PAUL'S CATHEDRAL. 95
ILLUSTRATIONS: —
Building of H. Hackfeld & Co., Ltd., Honolulu, Hawaii. — Office of the Same. — The Salle de Louis, Paris, France: a Restoration. — The Stewart-Haskell Free Library, Derby Line, Rock Island, Vt. — Proposed First Presbyterian Church, Homestead, Pa.
Funerary Chapel, Paris, France. 95
NOTES AND CLIPPINGS. 96

IT would take a very strong and nearly unanimous appeal from our subscribers to induce us to continue the form of publication which, during the current quarter, has been given experimentally to our International Edition. We are not satisfied with the practical working of the new method, which seemed to have the promise of many desirable possibilities in its favor, and believe that no mistake will be made in returning at the earliest practicable moment to the original form of publication. From the first issue for July, therefore, subscribers to the International Edition will again receive their copy in its familiar blue-covered weekly form.

MR. A. J. OVERMIRE, a Minneapolis architect, makes some comments on the great and increasing fire-tax in this country which are favorably mentioned by the New York *Evening Post*. Mr. Overmire's most novel suggestion, that municipalities "should take action against owners who disregard common-sense principles of fire-protection" is not, unfortunately, a very practical one, for the reason that "the common-sense principles of fire-protection" are very ill-defined, and are constantly changing, as new materials and methods of construction come into use; and to authorize municipal officials to prosecute owners of real-estate on such uncertain and arbitrary grounds would be to put in the hands of political heelers a weapon which would be used for blackmailing on a gigantic scale. If the principle of neighborhood responsibility, which is applied nearly everywhere in Europe, outside of Great Britain, were accepted here, as some of the most thoughtful insurance men now urge, careless and selfish owners of buildings would be sufficiently held in check by the fear of civil suits for damages, without needing the application of the criminal law. Mr. Overmire, however, indicates, unconsciously, a less radical method by which, pending a change in the laws, the situation might, so far as underwriters and the public are concerned, be immediately and greatly improved. Speaking of the fact that the insurance-companies, during the last year, carried on their business at a net loss of about nine million dollars, he says that in Philadelphia, for the last seven years, the net losses in the congested district have been five times as large as the total net loss, "because the premiums, as a whole, reduced the loss in that city, taken as a whole." This means, apparently, that the profit on the premiums on insurance outside the congested district made up the losses in the latter territory. Supposing, then, for the sake of making the matter clearer, that the amount of insurance carried in the congested district was the same as that carried outside, the obvious inference from the statement that the loss in the congested district was five times as great as the total loss is that the policy-holders outside the congested district paid premiums five times as great as they should have been, in order to make up the losses which the underwriters suffered from charging their customers in the congested district only one-fifth as much as they should have paid. This is not the first time that we have called attention to the fact that insurance-companies in this country, notwithstanding their professions of adapting the premium rate to the hazard, still grossly overtax the owners of dwelling-houses and other good risks, to make up the losses which they suffer from underbidding each other to secure large contracts on department-stores and warehouses, the premiums on which, by their own confession, are totally inadequate to the probability of loss; and the Philadelphia figures, which Mr. Overmire seems to take from official sources, show that we have not overstated the matter. Under these circumstances, we may, as representatives of a profession interested solely in the art of building, be permitted to say that if the insurance-companies in Philadelphia, instead of groaning and lamenting, would forthwith add four hundred per cent to their premium rates in the congested district, reducing them from that standard only in consideration of the adoption of safeguards which every architect understands, and would deduct four-fifths from the premiums paid by the owners of dwelling-houses outside the congested district, they would do more to call public attention to the conditions which increase or diminish the fire-hazard, and to promote the adoption of improved methods of construction and maintenance of city warehouses, than could be accomplished by criminal prosecutions in every State in the Union.

IT is rather amusing, in view of the lectures which American architects continually receive from insurance officials in regard to the superiority of foreign methods of building over our own in regard to resistance to fire, to read the account of a real fire in London or elsewhere, with the comments made upon it by the newspapers. A few weeks ago a fire broke out in a warehouse in London, in the quarter of the Barbican, where a large number of such warehouses are clustered together, with narrow streets between. How the fire originated is not stated, but it spread very rapidly, until nearly forty buildings were destroyed, with property to the value of more than five million dollars. In its remarks on this fire, the *British Architect* says, not without reason, as even the profession in America will acknowledge, that "internal partitions need no longer be made of match-boarding," while even "automatic sprinkling arrangements have got beyond the experimental stage, and ought to prove of real utility in coping with the incipient stages of a fire outbreak." The idea of fitting a storage warehouse with partitions of matched boards would seem preposterous to any American architect, and, in this country, at least, automatic sprinklers are so far beyond the experimental stage that their utility in putting out incipient fires is no longer a matter of speculation. The *British Architect* observes, further, that "the insurance-companies seem also to be disposed to quote reduced rates for buildings constructed on fire-resisting methods." It is indeed gratifying to learn that English insurance-companies are "disposed" to find the fire-risk greater in warehouses divided by matched-board partitions, with sheet-glass windows, opening on narrow streets, than in those glazed with wire-glass, and subdivided by partitions of masonry, but we can hardly infer from this circumstance that knowledge of such matters in England is enormously superior to that attained in this country, where insurance schedules have for many years taken account, in rates, of nearly every detail of construction affecting the fire-hazard.

THE fact seems to be that English methods of building are, at present, inferior to ours, and the comparative immunity of English towns from fires is due less to the solidity of their houses than to the methods of heating them. Open fireplaces, although they offer a certain danger, are, at least, easily watched, and, when there is no fire in them, which is the case with most English fireplaces all the year round, they present no hazard at all. If the same buildings were heated by steam or furnaces for six months in the year, as would be necessary here, and were provided with elevators in the American proportion, it is doubtful whether they would resist fire any better than our buildings. In another case in London, a man was working at night in a shop on the ground-floor of a house. In moving a lamp, he dropped it, and the oil, running over the floor, took fire. The fire spread so rapidly over the house that seven of its inmates were burned to death before they could be reached. The oil used in the lamp was tested, and found to flash at eighty-eight degrees Fahrenheit. We need hardly say

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

that the sale of such oil in most American communities is forbidden by law, while shops in dwelling-houses are guarded, in our large cities, in such a way that an accident of this kind would hardly be possible.

THE last *Bulletin* of the Department of Labor contains an interesting article, by Mr. Henry J. Harris, on the present condition of the smaller industries in Germany. It is hardly necessary to say that statistical treatises on social and economical subjects are abundant in Germany, and the figures which Mr. Harris uses are well chosen and significant. We have heard a great deal of late years about the economical revolution which would be effected by the supply of cheap motive power to small establishments, as distinguished from the great factories which have become characteristic of modern industry; and, in France, the characteristic French care for the individual citizen has led to the introduction, under the favor of the Government, of various schemes for the distribution of power in small quantities, by means of compressed air or otherwise. However this system may have succeeded in France, it has not made much progress in Germany, where the number of small establishments using motive power is insignificant, and tends rather to diminish than to increase. The substitution of small motive-power units for large ones has, indeed, progressed rapidly, but it is not the family workshops which have created the demand for small motors, but the great factories, which have found that the cost of motive power is so small an item in their expense-account that it is more economical, in the end, to use a considerable number of engines or motors, working independently of each other, than to depend upon one large central power-producer, the stoppage of which involves the cessation of operations in the whole establishment. So far is this new theory carried in Germany that in a great textile factory at Chemnitz every loom is driven by an independent motor. Such improvements in factory management do not, however, tend to throw work from the factory to the domestic workrooms, but the contrary. Every economy in production on a large scale makes competition more difficult for the small operator, and the little home establishments, of the mediæval pattern, steadily diminish. Undoubtedly, the disadvantages of the change are, to a great extent, offset by the enormous improvements which have taken place in modern factory life; and those who mourn the disappearance of the old German workshop, where the master and the apprentices worked side by side in producing charming articles of everyday use, and where the most intelligent and industrious apprentice usually, at least in the story-books, married the master's daughter, and became, in his turn, rich and respected, may console themselves in part by comparing the German factory-village of forty years ago, filthy, degraded and neglected, with that of the present day, orderly, well policed, and provided with numberless advantages, in the way of schools, hospitals, nurseries, churches, model dwellings, playgrounds and parks, which the last generation hardly dreamed of. It is true that much still remains to be done in this direction, but it now seems not impossible that the factory system, through careful regulation by law, and, still more, through the intelligent charity of the owners and managers of great establishments, may become the most powerful of all agents in the elevation of a large portion of the community.

OLD people in Massachusetts can still remember that the early cotton factories in Lowell were intended, not only to earn dividends for their owners, but to promote the intellectual and moral good of those employed in them. It was then thought that the management of a loom was quite compatible with refinement and modesty, and the farmers' daughters from the neighborhood, who formed the greater part of the operatives, were properly cared for, and, according to their own account, were happy and respected. Those who had a taste for literature united in composing and publishing, in their leisure moments, a very creditable little periodical, called, we think, the *Lowell Offering*, copies of which are still to be seen in public and private libraries, and very many of the operatives, both men and women, reached, later, high social standing. Somewhere in our own family is preserved a silver pitcher, presented to a cotton-mill manager by his grateful employés; and the relations between operatives and managers were generally pleasant and creditable to both sides. In the course of years, competition on one side, and socialistic eloquence on the other, brought a change in the conditions. The cotton-mill managers thought it necessary, in order to reduce cost of production, to lower wages to a point which would attract only the most destitute and ignorant operatives. It is doubtful now whether this was not a mistake; but it became the accepted policy, and the Anglo-Saxon farmers' sons and daughters were replaced by French Canadians, Hungarians, Poles and Portuguese, among whom the agitators proclaimed that capital was robbery. Although the Lowell mills have always been managed in such a way as to suffer comparatively little from labor troubles, they could not escape altogether the consequences of the alliance of ignorance, poverty and agitation, and, in a mitigated form, they share the common condition of textile and other factories employing cheap labor, in an absence of anything like the old sympathy between employers and employed. Whether this will ever return is, here as all over the civilized world, a question of great importance. It is possible that the improvement of machinery, and a demand for finer goods, may raise the standard of intelligence necessary in operatives, and with it the capacity for appreciating and reciprocating good feeling on the part of the employers, and it is at least an encouragement to think that whatever is done to elevate the character of factory operatives throughout the world will not have to be repeated for a lower class, the operatives themselves being now the lowest in scale among citizens of civilized communities, instead of being, as in mediæval times, representatives of the middle class, with a great mass of serfs and proletarians below them.

LE GENIE CIVIL publishes an interesting essay on trusts and other industrial combinations, in America and elsewhere. Concerning the American variety it quotes Mr. Havemeyer's opinion, that "the tariff is the mother of trusts," and mentions the example of the wire-nail trust, which sold in Hamburg for twenty dollars a ton the nails that it was selling at the same time in Baltimore for more than fifty dollars a ton, to show the effect of combination to monopolize a highly-protected domestic market. At the same time, it believes that trusts of a certain kind are useful, and may prosper, even in countries without a protective tariff. Thus, an association has existed in Germany for several years, among the coal-mine owners of the Westphalian basin, to regulate the output of the mines, as well as to fix prices. Naturally, in a country surrounded by other coal-producing regions, it would be impossible, without the aid of a protective tariff, to maintain exorbitant prices, and the operations of the association, or "cartell," as it is called, have tended to the advantage of consumers, by preventing violent fluctuations, while they have benefited the community by avoiding waste, at the mines, of the precious mineral which we are so rapidly exhausting. The Westphalian cartell is authorized and protected by law, and the Government itself is a partner in it, through certain mines belonging to the Government, which are members of the association. Under its constitution, the affairs of the mines are regulated by a Commission, chosen by the associated mine-owners. The Commission decides upon the amount of coal to be mined every year, and assigns to each mine its proportion of the total to be produced. If any mine produces more than its proportion, it is fined a certain sum for every ton in excess, while a certain indemnity is paid for the production of less than the proportion assigned. All the mines in the association are obliged to sell their coal to the cartell, and agree not to sell to any one else; and the Commission of the cartell sells again. As the Commission always knows how much coal it will have to sell, and how much it will cost, it can fix its prices without adding any margin for contingencies, and its customers can do the same, to their great advantage. The result of the system, as administered by the Commission, has been that, within the last six years, the difference between the highest and the lowest price paid for Westphalian coal has been only about twenty-two per cent; while, before the formation of the cartell, a variation of two hundred per cent had taken place within fourteen months, and the average price for four years before the formation of the cartell was considerably higher than for the four years following its complete establishment.

A PATENT has been taken out in Germany for a kind of brick, made with porous concrete, saturated with tar, for building into walls, in place of the ordinary wood brick, for nailing grounds and finish. In this country, where wood bricks, when exposed, in winter, to the drying atmosphere from furnaces or steam, soon become loose, grounds and nailing-strips are usually secured to the walls by nails, driven into the joints of the brickwork; and this method answers well; but, occasionally, a more secure nailing is required, and for this purpose the concrete and tar bricks seem likely to be well adapted.

THE GENIUS OF MICHAEL ANGELO.[1]

EMERSON says that when we learn the age of the ornaments on our iron fences, we shall think very well of the first men or ill of the latest.

We are constantly reminded, by religion and by the fatality of our own existence, of the eternity which lies before us; we recall too seldom the eternity of the past which becomes unknown. The architect should be brother to the astronomer, who computes time in such great epochs that the age of the earth is to him of little significance; to the geologist, who sees in the present but one layer superimposed upon innumerable other strata; then he shall learn to set a proper equilibrium to his thoughts, — to see the art of the present in proper relation to that of the past.

The spirit of novelty is ever present with its illusions, not because there are so many new things in the world, but because we ourselves are so novel to our surroundings. We know so little concerning the past of the earth wherein we live that we are prone to regard every recurring experience as being something new and original, but there is indeed not much that is original about us outside of the fact that we are new in our own sphere of existence, and may have power to impress our personality somewhat upon prevalent ideas which are the heritage of all.

Much is said of Nature and of fidelity to Nature in Art. We are, in fact, part and parcel of one creation and may safely assume that we can be original only in the same degree and in the same manner in which Nature herself is original. Human understanding is thought to be the culmination of nature; human intelligence may be more subtile and more comprehensive than other demonstrations of natural laws, yet it is not possible for us to elevate ourselves beyond, nor to separate ourselves from, other forces which move the visible universe.

Let us inquire, How is Nature original? Nature never produces a new form where an old one will answer her purpose. She sometimes makes new leaves, she sometimes creates new flowers and new fruit, but her processes are long and tedious; she clings to old forms long after they have ceased to be of service to her. If she is hurried in her interminable processes she produces freaks. Her oaks are always oaks; she may transpose them from soil to soil, and from clime to clime, until they have changed their forms, until they have altered the shape of their leaves, but she will never come to a period when they will bear other seeds than acorns. And yet new forms and new species she does produce out of the long periods of time at her disposal; also because she once labored under less restriction on this globe than she does at present. Earth, like ourselves, was once young and pliable, before she became set in the rigid mould of the present.

Cultivate the form of Nature if you will; change her daisy into a chrysanthemum; eliminate the seeds from the apple and orange; employ your art to shorten the length of her periods; to compress her epochs into seasons, her years into days and, yet, she will refuse to depart from fundamental types. Let us, then, turn to Nature for instruction, we who would invent new styles and new orders of architecture. She will offer us little encouragement, but she may set us in the right path. She may impart to us some of her sincerity, some of her unconscious power, some of the humility which is her strength. Let us not distrust the methods of Nature; she copies without hesitation; ofttimes in a perfunctory manner. God above us is Himself Prime Copyist when He rolls His nebula together to form new worlds.

In the town of Lancaster, Ky., there is a court-house erected at a period when vernacular building was at lowest ebb. The architect of the structure may have been a carpenter who knew nothing of the architecture of books. There is an arcade across the front of the building upon which he chiefly exercised the resources of his calling. He knew nothing of orders and arches, or of Vignola. He did not even take time to study orders from the Grecian example at Richmond Court-house, fifteen miles distant; he, in fact, flourished at a time when columns and entablatures were not in proper vogue. He made his piers exactly as he had seen the most recent examples of wooden columns in his own native village; somewhat more massive, it is true, in deference to the material employed, but square and with chamfered corners, after the manner of those with which he was familiar; he provided them with bases like those of his prototypes; he embellished them with capitals, not at the top of the shafts, but at the spring of the spandrels or braces; he produced his stone spandrels in direct imitation of those of the wooden verandas; he then set his architraves from column to column after the immemorial fashion. Now, I consider that man to have been a genius; I make this assertion in all confidence because he possessed the prime element of genius, sincerity. He but needed further opportunity; had he been permitted in like fashion to have builded for a sufficient length of time, he might have evolved a new style of architecture. For in this manner were the styles of the past brought forth; they were creations of times and circumstances rather than of conscious or continued effort. They are the outgrowth of the ages which fostered them, and not inventions of individual minds.

But I have mentioned Michael Angelo, and what may this digression of the village carpenter have to do with that most eminent master? They do not, indeed, stand so very far apart; there is no missing link to the chain which connects them one to the other. Michael Angelo is omnipresent in his personality. He stands amongst the most universal of men that have lived, and as such belongs to all times, to all men, to all things. It is not probable that the village carpenter (assuming him to have been such) was familiar with Vitruvius; Homer and Virgil may have been to him but mere shadows of names; yet I fancy that he must in some degree have been acquainted with Michael Angelo. That supreme genius must in some fashion have been connected with the development of his understanding; in some indescribable manner blended with what intuition of the symbols of art he may have possessed. Special knowledge he may not have acquired, neither of sculpture, neither of painting, certainly not of architecture, to associate with any of these the name of the Great Master. Yet, symbols of art of some sort he must have possessed. These belong to all who have attained the first degree of enlightenment. Vague or definite, mean or exalted, the mind turns instinctively from symbol to symbol. The building suggests the monument, the monument suggests the statue, the statue the painting, the painting the song, the song the instrument. We all of us are architects, sculptors, painters, poets, musicians, in some degree, at some moments of our lives. We all of us have symbols, whether conscious of the fact or not, and in so far as these pertain to modern art they are in some manner associated with Michael Angelo. We will therefore allow our village carpenter to have been, at the moment he set his architraves upon their columns, somewhat inspired and therefore imbued with some measure of the spirit of the Great Master.

On the Italian steamer on board of which I was a passenger from New York to Naples, there was a bright boy, presumably a new apprentice in the art of navigation; his duties were of the menial sort, yet he evidently was not an ignorant lad and may have been at the commencement of some successful career. One day he was employed at painting on deck, and his remarks seemed to amuse those of our company who understood his tongue. "What does he say?" I asked. "He says, 'I am the Michael Angelo to-day,'" responded an Italian. The lad had but reminded us of the vast influence of Michael Angelo over the entire world.

When, shortly after that incident, I saw in Florence the drawings executed by Michael Angelo as a student — first attempts which seemed so near akin to our own primitive essays at drawing — I recalled the boy on the steamer. We are so much alike, with the same human nature after all, the greatest and the least; the difference which separates us one from another is more often in degree of sincerity than in measure of resource. Every one of us is a Michael Angelo to the extent and degree in which he is endowed with faith and that strength of purpose which is not the outgrowth of craft, but the spontaneous sincerity of the soul.

The qualifications of the great artist do not consist in logic, or in any faculty of abstract reason. Art is the spontaneous expression of intuition. Art has always flourished in more intimate relations with religion than with science, insomuch that Faith may be considered as the foundation of Art. Without faith, intelligence may build bridges, railroads, skyscrapers, warehouses, produce scientific marvels, but cannot create architecture, cannot give vital expression to any form of art. If we do not entertain that ideal which is so very near akin to religion, then is the artistic spirit not within us. The intuition of the beautiful may be fostered and cultivated, but cannot be wholly acquired; it must be inborn, and cannot be attained through education, however much education may be necessary to give it form and expression. Therein lies genius, the true and trite reason why geniuses are born, not made; yet, we all of us have some spontaneous sincerity within our souls, and are to some extent geniuses. Art being the heritage of the soul rather than of the mind, we can readily understand how those ages which were less enlightened than our own should have surpassed us in those things which appeal to the emotions and to the feelings. They were believing ages; they were dominated by men who worked through faith. The Great Masters of those times were Dante, Titian, Michael Angelo, giants of truth and sincerity. We may not approach them without adding to the measure of our own faith. We may not write a poem, paint a canvas, conceive a monument, without becoming conscious that the eyes of those masters are resting upon us. They accuse us of hypocrisy, of frivolity, of shallowness, yet they will in no wise discourage us, but add to the measure of our strength. Their faith enables us to understand the elements of truth. If we have not already entered within their influence, we are as yet as little children that have not learned their A B C's.

The entire world has been under the spell of Michael Angelo; his influence has been greater than that of any other man who has given impetus to the development of art in our own times. Three hundred and fifty years have passed, and his greatness has not lessened, neither has any appeared to be his rival since his day. He stands before us a lofty mountain in eminence; he may be compared to Napoleon in the magnitude of his personality. His individuality is in itself more significant to the world than any specific achievement of his skill. He appeared capable of all things; he surpassed other men in the intensity of his faith, the depth of his sincerity, the warmth of his imagination, the fertility of his resource, the measure of his industry. It is interesting to follow every incident of his long and eventful life. He imparts form and color to everything upon which the impress of his gigantic mind is cast. He is not alone the man of imagination, the sculptor, the painter, the architect, but also the skilful engineer, the builder of roads and ramparts, the counsellor of princes, the man who dared confront the

[1] An address by S. E. Desjardins, F. A. I. A., before the Cincinnati Chapter of the American Institute of Architects, May 20, 1902.

Pope, the man of impulses who tolerated no rival; in all things more than other men.

If we conceive of originality as being embraced in individual force and personality, and not in novelty nor in ability to effect unusual combination and achieve striking results, then is Michael Angelo the most original of men. Otherwise he was original in no extraordinary manner; he understood the futility of striving after novel effects and novel forms, the meagreness of all resources, the inadequacy of mere dimensions to produce results. He was adept in device and invention, making more use of these in painting than in architecture, but he fully understood their subordinate purpose, their secondary province in the realm of art.

I restrict my attention chiefly to Michael Angelo in his relation to us as architect. Architecture was to him but one of the many incidents of his long and productive career. It was but late in life, at a period when the labors of most men are drawing to a close, that he began the serious task of the dome of St. Peter's. He did not propose the dome as an original idea, but merely undertook to carry on the work of his predecessors. Even the oft-quoted assertion that he proposed to suspend the Pantheon in mid-air did not originate within his imagination. Bramante had entertained a similar proposition a hundred years before. It is quite certain that St. Peter's would have had a dome had Michael Angelo never been called upon to produce that remarkable culmination of his genius. It is also probable that the dome would have been fully as great and fully as high as the one which was carried into execution. It is also to be conceded that without the Great Master the dome would have exhibited as much invention in conception, and, in all probability, would have been more profuse and elaborate in detail. Rosselini probably embodied a dome in his original scheme submitted to Pope Nicholas; Bramante conceived a grand dome for St. Peter's; Sangallo designed another and more elaborate one. Since the day when Brunelleschi began the great dome of Florence, it had become the dominating idea in architecture; no monumental structure was conceived without the dome. Michael Angelo set about to finish the work already begun: to complete the dome which should exceed all other domes; not in breadth, although it needs must be vast; not in height, although it needs must be lofty; height and breadth the dome must possess, but it must include far more than mere dimensions. He was a Florentine, born within the shadow of the great dome of Florence, while here in Rome he was restricted within limits less in extent than the vast area crowned by the vault of Brunelleschi. Notwithstanding this restriction he made his dome to exceed that of Brunelleschi in all those essentials which embody the conception of greatness, grandeur and simplicity. The dome of Florence which he was to copy and to surpass was vast, grand, lofty, sublime, sombre, ponderous. He embodied in his structure the first of these attributes; he eliminated the last, sombreness and ponderosity. Before him Brunelleschi also had studied the Pantheon at Rome so as to conceive the stupendous idea of suspending the Pantheon in the air and setting it aloft upon lofty piers, but he labored under greater disadvantages than did his successor, and the Pantheon in transformation lost his contour of its vault, the beauty of its proportions. Michael Angelo was equal to the task of overcoming all objections, literally suspending his dome above its vast supports, where it looms in unsurpassable majesty the most notable architectural achievement of modern times. This he accomplished, and, with intuition yet more subtile in simplicity, produced in the exterior structure of the dome a worthy complement of the interior.

The contrast between the dome of Brunelleschi and that of Michael Angelo is the difference between first experiment and final result. In the former we are at once reminded of the ponderous weight set upon the piers, we admire the invention and daring ingenuity of the architect. In the latter we are unconscious of the piers, oblivious of the personality of the architect. The grandeur and majesty of the vault is all-prevailing; it is the true Pantheon in mid-air.

There is no invention, no novelty of form; the same columns, pilasters, capitals, architraves, pediments, which are the heritage of all Italian architects. Nothing new, but the great result, the thing, itself.

This simplicity is characteristic of all of the architectural creations of Michael Angelo. He employed few forms, the most simple motives, the most ordinary types, yet he invests these with individuality they had never yet possessed. The pediment assumes grandiose proportions; the festoon, Titanic magnitude at his hand. To him especially belongs the high segment introduced so effectually in St. Peter's and in St. Mary of the Angels. Neither may we pass without notice the Farnese Palace. Here we find the crowning feature, the great cornice of the Florentine Palace transported to Rome with added dignity and inimitable grandeur.

We arrive at a definition which enables us to understand the distinction between originality and servility, and it embodies in a comprehensive sense the difference between copy and unworthy imitation. The master mind which copies learns to begin where others have left off; knows how to finish where others have begun, and this talent is not within the range of the servile, who begin where circumstance may place them and never attain more than a portion of the success of others who have labored in the same fields before them. If we have learned what our predecessors have acquired and are able to complete anything whatever which they may have left unfinished, then have we achieved success and have accomplished the work of the original minds.

Great men are the product of the places and times which offer them unusual circumstances in which to achieve renown. In order to understand the career of Michael Angelo, we must also learn the history of Florence during the three centuries which preceded his day. We must be familiar with the career of Arnolfo, Giotto, Brunelleschi and a host of others who exerted before him their influence upon the art of Florence.

We turn from Italy and find an illustration of this fact in the works and fame of Shakespeare. We are all familiar with Shakespeare, but we are not sufficiently alive to the fact that Shakespeare might not have been immortal to us had he not been preceded by many who prepared the way for his coming; had he not been surrounded by a hundred other poets and dramatists of no mean genius, of whom his greater genius was the culmination. We may in our own country find an opposite example in the career of Richardson, the greatest architect of our times. He came at the beginning of these things, as it were; not to impress his large individuality on work which others had begun, but to give expression to genius with foreign symbols in a land where there were no established traditions of art. He achieved remarkable success; exhibited great originality and strength of purpose, but exerted no lasting impression upon the architecture of the age. In fact, he left none to complete the work which he himself could do no more than to begin. His forms were alien, his symbols exotic; it would have required greater geniuses than he to have carried out his style to rational development, and this the natural limits of human ability precluded. His works remain to us interesting in themselves, but they will not serve the future as prototypes because they are not in harmony with the spirit of our times. Had Richardson remained in Paris; had some great opportunity like that of the Grand Opera-house come to him, then might he have attained immortality when our more primitive conditions denied him. The right sphere of the great master is at the culmination rather than at the beginning of events.

It may not be within the range of our experience to be great masters; the world has not place for many Michael Angelos; we are obliged to do those things which are set before us to be done, but nevertheless the masters' lesson is given us to learn; the power of discrimination, the distinction between originality and imitation is put to us at all times and under all circumstances. We may all of us have within us some of the spirit of Michael Angelo. We may not have opportunity to build enduring monuments and domes, but it is necessary that we should in some measure have the souls of those who build monuments and domes in order to achieve the least success in anything. It is necessary for us to have within us far more than we have opportunity to impart to our work, and we require not mere knowledge of facts, but intuition which gives the mastery over facts. If a man has expended all of his resources in the accomplishment of anything, something will yet be wanting in the result of his effort. His work will not stand in complete entirety, but will, in some measure, be a failure if in its conception or execution he has exhausted the power of his art. This fact cannot be too strongly impressed upon us in this practical age wherein so many are eager to undertake tasks which are beyond their measure. The Great Master was in himself more than his statue of Moses, greater than the allegories of the Sistine Chapel, greater than the dome of St. Peter's. His career was an evidence of supreme power which he could not express in any of the works, and in his old age he poured forth yet more of the inexpressible depth of his nature in verse, for he was a great poet as well as a great sculptor, a great painter and a great architect. In a sonnet to the Supreme Being he voices the universal prayer: —

> "The fetters of my tongue do Thou unbind,
> That I may have the power to sing of Thee
> And sound Thy praises everlastingly."

These words have a familiar sound, and they also serve to remind us that all familiar things have great origin, else they cannot endure long enough to become universal. We feel our spirits expand, we become greater in the presence of so vast a soul, wherein genius is so intimately blended with simplicity. If we study all of the achievements of Michael Angelo we shall find that they are all comprised within primitive elements: sincerity, faith, application. He followed beaten paths of knowledge; he adhered to standards set by others of his own times; he employed invention sparingly; he tried few experiments; he troubled his spirit little concerning originality. The principal lesson of his life is that of application. He studied long, continually and unremittingly; he labored patiently and untiringly. We all of us may do these things. He taught us the important lesson that nothing of permanent value may be attained without long preparation and assiduous preliminary study. He impresses us with the fact that the untutored spirit may not aspire to the work of the trained imagination, the well-stored mind, the skilful hand. We may all of us learn these lessons if we have time and opportunity before us. Cultivate the talent, and the genius will come forth in the well-beaten path, the originality will find new expression. The sum of originality in any one man, even the greatest, is so small as to be of little avail, unless when to the personality of genius is added the considerable heritage of others who have preceded in the same path.

We will place beside the dome of St. Peter's at Rome, the Mole Antonelliana at Turin. The Mole Antonelliana is one of the most original structures of our times. Its conception involved much creative skill, brilliant imagination and constructive ingenuity. There appears to have been no utilitarian problem involved in the planning

of the pile to compel its author in any manner to sacrifice the artistic proportions of the monument. It is unlike any other great building ever projected, and yet I will venture to assert that no one would revert to it as a type from which to conceive any monumental pile. It may be more beautiful than the average skyscraper, which we forgive as the outgrowth of conditions which in themselves are not beautiful, but it is nevertheless an object-lesson of the futility of invention when applied to art.

I will bring in contrast to the above another structure which bears a distinct message to us in these practical days when we find it difficult to associate beauty with utility and are prone to consider that they bear no relation to each other. I refer to the Or St. Michael at Florence. This building was erected as a grain-market and for the storage of grain, and upon it all the guilds of Florence lavished the symbols of their crafts. It was built at a time when the Artist was more powerful than the King, and among such treasures of art was the greatness of Michael Angelo fostered. We have need of such to stand before us and accuse us of our sins of ugliness. If we but strive to make our markets and warehouses as beautiful as the circumstances which surround us will permit, we may come again to a time when men will spend less for sordid desires and more to elevate the spiritual nature of the people.

For if we consider the relation of art to other dominating forces of our age we shall be compelled to admit the fact that we do not live in an age which can be favorable to the presence of great masters. Their spirit is not in our atmosphere, their examples are not among the incentives which actuate the people of our times. But we are not to entertain the idea that the day of art has departed forever. All things are recurrent. All periods pass away but to return. We may arrive at some rare epoch when the soul of sincerity and truth and the spirit of science and investigation shall work hand in hand, and progress in harmony; when some master of the future shall attain greater results than the world has yet conceived. We have at least this consolation: if we are devoted to the beautiful, we are in employ of the highest on earth. We are followers of the truth, and, like St. Christopher of the ancient legend, we serve none but the strongest. The millionaire may buy nothing better than architecture, sculpture and painting with his money. Else wherefore this eagerness for fine houses and rare works of art? Is not Michael Angelo this day greater than the great pope whom he served? If we cannot ourselves be masters we are preparing the way for the masters that will come; and wherein might we find more exalted occupation? When the day of greater things in architecture arises, then shall the architect cease to be primarily a man of affairs and an engineer and shall resume once more his real avocation; he shall once again be artist equal to the task set before him. Think not that the influence under which we live may be sufficiently powerful to change wholly the current of events so that the future shall have nothing in common with the past. Think not that the artistic feeling may ever wholly be crushed from the soul of man; it is too deeply rooted in the very essence of human nature ever to become extinct. We are told that every philosopher is a failed poet, that is, he became a philosopher after he had made the discovery that he could not be a poet. In like manner the ranks of the busy world are filled with men who follow other avocations because they cannot be artists. Else wherefore this universal eagerness for things which appeal to the imagination? Is it the wood and the stone, the brick and the cement which brings us here together? Is it not rather the symbols these things represent which attract us, and do not these seem more beautiful to us than they are in reality because we carry more of the ideal within our souls than we are willing to acknowledge to ourselves and to one another?

Our small measure of effort is all necessary to the future; none of it can be spared. We are all working towards a time when the people shall themselves become possessed of more artistic intuition, more power of discrimination between the beautiful and the deformed; when all men are in themselves artists in some measure or other; when the man shall have conquered his monster of iron and the machine shall have imbibed the spirit of inspiration from the soul of man. At that time the Great Master shall reappear and he shall be surrounded by multitudes of lesser masters.

We may receive the consolation out of the midst of our own inartistic surroundings. Think ye that the streets of Florence never fostered unsightliness, even when the artistic spirit of the age was concentrated in that city? Let us not consider that the circumstances under which we labor are utterly hopeless. We see much deformity in the present, and are prone to magnify the beauty of the past, but we are not to entertain too intimately the idea that the present is devoid of beauty, that the past was freed from the restrictions of our conditions. Nearly all of the past has been wiped out from our remembrance forever; what has remained to us has been the best and most cherished, and to complete our illusion Time has softened the outline of all remnants of the ages to lend them grace. Our remote ancestors, did they not have their daily problems, also? They did not build monuments and temples alone. They must have places to eat and places to drink and places in which to transact business. Are we to suppose that all of these were beautiful and sublime? Perhaps they were beset with no conditions of smoke and steam-engines, no problems of pipes and electric-wires, but compromising conditions and forms of ugliness they surely must have had with them at all times. The familiar history of the past is comprised chiefly in recitation of the affairs of potentates; of war, bloodshed and contentions. Had we but more definite knowledge of the peaceful annals of peoples; had we but clearer record of their customs and domestic habits; could we but enter intimately into their abodes and have introduction into their daily lives, then might we have better understanding of the past and better profit by the experience of others who have solved the same problems before us.

Some sixty miles south of Naples lies the site of the ancient city of Pæstum. Nothing remains within the walls but the ruins of three temples. Within the vast enclosure of the walls are cultivated fields and a few farm-buildings; nothing else but those impressive ruins. At the time of Christ these temples were already five or six hundred years old. During the long existence and in the many vicissitudes of that city, what other buildings, what succession of other buildings, occupied all of the space within these walls? We know, indeed, little whatever concerning them. Temples, theatres, halls, markets, storehouses, dwellings, all structures required to constitute a great city (and human nature was not so very different long ago from what it is at present), such there must have been to supply the wants and customs of so many centuries. They have been utterly wiped off from the face of the earth, and we may reasonably suppose that they were not all worthy objects in their own day. Perhaps the architects of those times complained of lack of opportunity to build monuments and temples very much as we do to-day, since out of so many centuries so few of these remain. We have, in fact, but one clear glimpse into the daily life of the civilization of antiquity, and that is in the object-lesson of the buried city of Pompeii. We know but little of the ordinary buildings of ancient Rome, and out of that vast city of monuments but one structure has been preserved to us intact — the Panthéon. The present alone is ours in which to perform our little parts, and when we learn how Time has preserved to us so little of the past, how may we question the future with any degree of assurance?

We will revert once again to Michael Angelo ere we close. His vast personality is present amongst us in the material sense, in a manner scarcely realized by multitudes of those whose intellectual development has come within the range of his power. The most imposing structure in our land, the dome of the Capitol at Washington, may attribute its beautiful form to a reflex of the supreme genius of the great master, through the intermediary of Christopher Wren and of Walter, it is true, but with salutary presence in our midst; redeemed by noble form from the baseness of the material in which it is embodied and exerting grateful influence upon the architecture of the present day.

PARIS

THE ANNUAL SALONS. — THE SALLE DE LOUIS.

FROM a general visit to the architectural section of the two Salons this year, one brings away this first impression, that there is in particular at the Société Nationale des Beaux-Arts a lot of furniture, and at the Société des Artistes Français many water-colors. Water-colors, which generally deal with motives of architecture, even when little surrounded by plans, façades and technical drawings, can always be held somewhat to represent works of architecture, but furniture rather calls to mind the exhibits of cabinet-makers. This reproach, formulated last year apropos of the Salon of the Société Nationale des Beaux-Arts, is addressed anew to that school of artists who, architects, and talented architects, exhibit hardly anything else than tables, cabinets, chairs, arm-chairs, book-cases and bedsteads. There is exaggeration about this. This is no longer an exhibition of architecture. It is interesting, and I will repeat it again and again, to see an architect compose a bit of furniture and all the accessories of a dwelling of which the *ensemble* will in this way form a unity, adding all the more effect to an attractive harmony. But an isolated bit of furniture without its architectural enframing is a manifestation of art which is more open to criticism. If this piece of furniture is exhibited by a furniture-maker, we do not demand of it any other qualities than those of elegance, satisfactory shape, good taste and solidity. If it is an architect who exhibits this same bit of furniture, we have the right to demand of him a reason for the forms he has adopted, and why he has used this style rather than another, and the best way of enlightening us is to show by the side of the furniture which is the mere accessory the building which is the chief end. Decoration of an isolated room may be interesting, but the neighboring room may afford a contrast which is simply shocking. The tapestry decorators do not hesitate to make a dining room in the Henri II style balance a drawing-room in Louis XV style. The architect ought to show a greater regard for the æsthetics of harmony in the *ensemble* of his work. And this is why a piece of furniture, agreeable enough to see by itself, only has a mediocre interest if it is exhibited by an architect. And the whole story lies in this.

La Société Nationale des Beaux-Arts is essentially modern, and it is in that school of design which it has been agreed to call " L'Art

Nouveau" that it most willingly seeks its inspirations; and this very peculiar art demands above all a greater harmony in its manifestations. Without this it runs the risk of amazing the observer rather than anything else, by underscoring, as it were, an originality which may easily become sheer eccentricity or pretentiousness. Yet I do not take sides for or against the tendencies of L'Art Nouveau. It has already sufficiently proved what there is in it in the way of suppleness, charm and homelikeness, but only on condition that it does not overpass certain limits of allowable fantasy. In architecture it has not yet learned how to get along without dwelling-house, villa and cottage. In this class of work the house of M. Majorelle at Nancy, exhibited by M. Sauvage, architect, is very interesting. Majorelle and Gallé, both citizens of Nancy, have given a great impulse to modern furniture. Both have sought to give it a new style, new forms, and they are among those which exhibit the best taste. M. Sauvage has set himself to preserve unity in the composition of his house, although one perceives his pre-occupation to do something other than that which is ordinary and banal. Bays, up to the present time, have only been square-headed, full-centred or with pointed arches. M. Sauvage has found means of conciliating these three forms by creating a fourth, which evidently lacks frankness, — he snips off the top of a pointed arch and at the point of snipping joins the curved lines of his arch with a horizontal line; but yet in the interiors which he exhibits at the Salon, these new forms do not lack elegance. This is to say that everything in M. Sauvage's work operates to help the harmony of *ensemble* and so makes one pardon certain excesses of the imagination and the constant pre-occupation of the designer to avoid the banal at any price. Here, at least, one feels unity in the style and taste. M. Bracquemond does not satisfy this demand in the decoration undertaken by him for a gallery and billiard-hall. Why does M. Bracquemond, who is an artist of the first class, an engraver of great talent, not content himself with exhibiting his talent in that form of art which has won him his reputation? "Each one his own trade" very wisely declares the proverb. An engraver is not perforce a decorator, nor even an architect. Does M. Bracquemond believe that he has found a new formula for his mantelpiece in ebony and amaranth, composed to support and enframe an alto-relievo by Falguière, carved in wood by Léopold Savine, and painted by himself? Alas! The result is heavy, mournful and ugly. A massive crosspiece of ebony-wood is supported on two uprights of the same wood with impoverished mouldings, and supports the alto-relievo grossly painted in flashy colors. Probably M. Bracquemond ranks among those who lament over the banality of our modern architecture, and the powerlessness of architects to escape from ready-made formulas. Ah! Rather, a hundredfold, let them rest where they are in these ancient formulas than seek a new one such as this.

Ebony has also tempted M. Charpentier, who, not content with being a charming sculptor, energetic or graceful according to the case, has attempted a composition for a grand piano, all in black, massive and heavy, which the moderately decorative paintings of M. Besnard overload rather than enliven. After seeing these things one turns with feelings more inclined to indulgence to the furniture exhibited by architects who, for their part, construct and put their materials together in logical fashion.

Among the works of architecture exhibited by the Société Nationale des Beaux-Arts, we find a very serious study of the church at Cormeilles-en-Parisis by M. A. Besnard, and also certain other projects for churches, of no great interest, which rather strike one with astonishment as one sees them in the midst of the "modern style" furniture which fills the halls. We must mention also the dependencies of the Château de Bois-Chicot by M. Lucien Roy, presented in the shape of photographs and drawings whose skilful rendering makes still more attractive a composition very seriously studied in a pseudo-Renaissance style. M. Plumet, who always exhibits furniture which does not vary much in style, has known how to devise for an apartment-house a very personal and modern note, all the more interesting that it indicates a very rational feeling in the employment of his materials. And this proves that L'Art Nouveau does not exclude the spirit of method.

Architecture, properly so called, is represented in a more complete fashion at the Salon des Artistes Français. I have said there was to be found here an enormous number of water-colors. This is not displeasing, and the public is rather attracted by the picturesque sketches, freely colored by skilful brushes, and finds them more attractive than plans and technical drawings in which it does not find many things to understand. One style of work does not interfere with the other, and there is something for taste of all kinds. So it must be acknowledged that the Salons d'Architecture are much more frequented than formerly, and though one does not meet here the crowds that fill the galleries of painting, one does find in them a certain number of interested visitors.

How can one not but render homage to an effort as considerable as that of M. H. Eustache, who sends a remarkable study of the present condition of the restoration of the Via Sacra at Rome, and the Byzantine edifices of Mistra in Greece. The restoration of the Via Sacra is a learned evocation of ancient architecture, and from its ruins, so picturesque in themselves and having such elements of grandeur, M. Eustache has caused to be born again temples, triumphal arches and basilicas, the arrangement of which on the right and on the left of the Via Sacra forms a very important composition. It is a superb and precious work of archæology which allows one to judge of the importance of the excavations recently made, thanks to which M. Eustache has been able to push to so high a degree the exactitude of his restoration.

M. Eustache's second *envoi* yields in nothing to the first, from the point of view of interest. The town of Mistra, in Greece, has lain in ruins since 1770, but some portion of it has remained still usable. M. Eustache has drawn out a plan of the town and the present condition of the two monasteries of Peribleptos and the Pantanana, the details of whose architecture, sculpture and decoration are presented with skill.

Another work of restoration attracts the attention of artists who are interested in the history of our French architecture. This relates to the Salle de Spectacle, to-day the Théâtre Français, built by Louis in the Palais Royal in 1790. After the fire of March 8, 1900, the reconstrution of the theatre was entrusted to M. J. Guadet, who chose as his assistants his son, Paul Guadet, and one of his pupils, M. Charles Prudent. It is these latter who exhibit at the Salon the interesting restoration of the Salle de Louis. In the works of demolition and reconstruction of the Théâtre Français, MM. Paul Guadet and Prudent uncovered remains of ancient construction imbedded out of sight in later additions, very interesting documents, quite unknown until these discoveries. These investigations which they made have resulted in enabling them to present the first elements of a monograph which will be published after the close of the Salon.

Louis, who had already built the great theatre of Bordeaux, was instructed by the Duke of Orleans to make a study for a new salle de spectacle on a site at the corner of the Rues Richelieu and St. Honoré. The work, begun in 1786, was finished in 1790, but the new theatre, originally intended for the opera, was occupied by a troupe of comedians of the most modest merit, and was leased to the director of the "Variétés Amusantes." It was in 1791 that the Comédie Française, with Talma at its head, was transported thither. In 1799 two architects of medium talent were employed to renovate the Salle de Louis, and they partially destroyed his work. Fontaine, in 1822, was entrusted with the remodelling of the hall, and it is his work, with some slight changes, which was preserved up to 1900, Chabrol, in 1863, having changed almost nothing during his restoration, and M. Guadet in rebuilding the hall in 1900 has made few changes in the auditorium of Fontaine and Chabrol, except so far as concerns the stage.

To-day, we read in the notice which accompanies the study of MM. Guadet and Prudent, there remains nothing of the theatre of Louis except the walls of the façades on the Rues Richelieu and Montpensier, the foundations and some small portions of the circular vestibule. The restored plans of the theatre of Louis are accompanied by a perspective view of the ancient hall, very original and picturesque, and this study [see Illustrations] is certainly one of the curiosities of the Salon of 1902.

There are always the same school *projets*, the same drawings offered in public competition, churches, barracks, town-halls, châteaux and villas. All this would be very monotonous without the water-colors, which are truly superb and skilfully done. Some are sketches more or less picturesque, others are measured drawings of more serious architectural interest. For example, M. Chauvet shows a drawing, quarter full size, of the frescos decorating the old manor-house of Challant at Issogne, in the valley of Aosta in Piedmont. M. Polart shows a drawing of a lavabo attributed to Luca della Robbia, in the Church of Santa Maria Novella in Florence. This artist has marvellously rendered the real aspect of the *faïence*. There are numberless other architectural water-colorists who deserve notice, and of them I will mention at the side of those I have just named MM. Moisand, for his monument to Giovanni at Florence, Ottin, for his old stained-glass window in the church of Ploërmel, Patouillard, Perrin, Rey, Riquet, Santerre, Tauzun and Yperman, the latter, a master in the art of rendering an impression of fresco-paintings. The one which he exhibits this year after Benozzo Gozzoli, in the Campo Santo at Pisa, continues in a marvellous fashion the documents which for a long time this most scrupulous of artists has been collecting.

BOOKS AND PAPERS

SO many people in this country are engaged in one way or another in the arts of decorative composition that this book[2] of Mrs. Vanderpoel's meets a serious want. People who have no practical acquaintance with the subject often say that a decorator must "depend on his eye" for harmonizing his colors, and that without "an eye for color" no one can expect success; but, although this is quite true, the only way in which a mere "eye for color" can be made available is to present to it a series of combinations, and let it choose the best among them. This process takes a long time, and even the most sensitive artist in decoration will find his work immensely facilitated by the possession of a set of rules, deduced from the practice and experience of others, which will show him at a glance the combinations of colors, and the values and proportions of each, which have been found to be most agreeable. With data of this kind to start from, he can plan his scheme at once, so as to

[2] "*Color Problems.*" A Practical Manual for the Lay Student of Color. By Emily Noyes Vanderpoel. New York: Longmans, Green & Co., 91 Fifth Avenue. 1902. Price, $5.00.

include the colors which he selects in their most advantageous values and proportions, without wasting time in blind and unsatisfactory experimenting; and the intention of the present work, which has been carried out, on the whole, very successfully, is to supply an ample quantity of what may be called the raw material of color-harmonies, from which the practitioner can choose what he needs for each particular case, developing, of course, the proper proportion of pink into roses or cherubs, as he may please, and his blues into summer skies or knots of ribbon, but secure in the certainty that, if he keeps the quantities and values of each color within the rule, his work is sure to please. Dr. Christopher Dresser, in his admirable books on Decorative Design, which, curiously enough, Mrs. Vanderpoel does not mention in the extensive bibliography in the Appendix, went over much the same ground, in the same way, and gives a set of exercises for the student which might advantageously supplement the theoretical information in Mrs. Vanderpoel's book; but the latter contains much more matter than the Dresser books, and gives a series of analyses of Chinese, Japanese and other decorative works which are of great value. We regret our inability to say the same of a few plates, purporting to convey "color notes" from nature; but, as they do not seem to relate to anything in the text, and as there are more than a hundred other plates, the student is not obliged to trouble himself about them. In another edition these might, perhaps, be advantageously replaced by plates showing the process of analysis of a piece of Japanese embroidery, or Chinese porcelain, or Moorish tile, by giving the actual pattern in its colors, divided into squares, so that the student can count for himself the number of squares showing the relative area of each color. This is an extremely valuable exercise, and prepares the way for a better understanding of the diagrams which, like those given, simply show the colors in their relative proportions, without any hint of their distribution, and are, in consequence, although easily interpreted by an expert, rather difficult for learners to use.

THIS little book[1] presents very well the examiner's view of brickwork, and, in fact, as the preface tells us, it is intended primarily to cover the City and Guilds of London Institute's examination in the theory and practice of brickwork, as well as that part of the examination of the Board of Education in Building-construction which relates to brickwork; and, after this, to "assist bricklayers in the principles of bonding, and cutting and setting gauged work generally. It does not follow from this that the book is not practical; on the contrary, it would be difficult for the most experienced journeyman bricklayer to write one more practical; and it has the advantage of containing a great many suggestions which are outside the experience of most journeymen, but which will add materially to the resources of a mechanic who finds himself obliged, in actual work, to deal with new or unfamiliar problems.

It is hardly necessary to say that the English methods differ greatly from ours, in bricklaying, as in most other branches of construction. The author, for example, calls English bond, of alternate courses of headers and stretchers, "by far the strongest, and, in the opinion of many, the best in appearance," of all bonds. Among our masons, this bond is regarded as deficient in longitudinal tie, and, where the utmost strength is required, the usual bond in this country consists of one course of headers to five, seven or nine courses of stretchers. Mr. Richards does not mention at all the variety of English bond often used in France, in which the stretchers break joint over those in the second course below. This bond is considered by the French masons superior in strength to the plain English bond, and is certainly more attractive in appearance. It may be observed that American bricklayers, when they speak of "old English bond," always mean what is known in England as "Flemish bond," consisting of alternate headers and stretchers in each course. This bond is often used here in face-work, on account of its old-fashioned "Colonial" effect, but neither it nor the genuine English bond, of alternate courses of headers and stretchers, are ever seen in walls where strength is considered rather than appearance.

After these observations on the different bonds, a very good set of diagrams is given, showing how corners are to be managed in walls of different thicknesses, this not being always an easy problem in walls built with English or Flemish face. Illustrations are given of diagonal and herring-bone bond for the interior of very thick walls, but nothing is said about the best and most useful form of diagonal bond, where face-bricks, which are always laid with us all stretchers, have the corners clipped off, to allow a diagonal header in the backing to be brought nearly out to the face of the wall, resting, of course, on the middle of the stretcher below, and tying the facing course very effectively to the backing. In the same way, chimney-stacks, which, in this country, almost always show stretchers exclusively on the outside, can be well bonded by clipping corners of the withe-bricks, and inserting the ends in the spaces formed by clipping corresponding corners of the outside bricks.

Next, follow some useful directions in regard to forming chimneys, fireplaces and so on, which complete Part I; the succeeding Part being devoted to "gauged work," which, in England, includes all the varieties of cutting and rubbing used in brickwork. Here, again, although this portion of the book is particularly well written and valuable, the English practice differs greatly from ours. Although a good deal of cutting and rubbing of brick is done with us, we are obliged to use hard bricks for the purpose, as the soft English "rubber" bricks will not stand American frosts, and our work is, therefore, rough in appearance, in comparison with the fine and accurate English gauged work; but, as a compensation, we have at command an almost unlimited variety of moulded bricks, which replace advantageously those cut and rubbed to shape. However, in case a cut brick is needed, it is well to know how to cut it accurately, and no book with which we are acquainted gives such careful and clear directions for the purpose.

[1] "*Bricklaying and Brick-cutting.*" By H. W. Richards, Examiner in Brickwork and Masonry to the City and Guilds of London Institute. With over 200 Illustrations. New York and London: Longmans, Green & Co. 1901.

INCRUSTATION ON ST. PAUL'S CATHEDRAL.

IN a recent "Note" in the *Builder* reference was made to the paper read by Mr. E. G. Clayton before the London Chemical Society on the subject of incrustations taken from the Portland-stone balustrade round the base of the dome of St. Paul's Cathedral. Some further consideration of the subject may be of interest.

This balustrade is surmounted by a heavy coping-stone of the same material; much of the surface is greatly "weathered," and is coated by a stratum of a gray or black substance which in some places (especially on the underside of the coping-stone) attains a thickness of three-quarters of an inch. This material, which is brittle and detachable with a knife, has a very rough and irregular surface, is stalagmite in character, and though differing in color, in other respects resembles very closely some boiler deposits, and is easily reduced to a fine gray powder.

ANALYSIS OF THE INCRUSTATION.

Water (lost at 100° C.)	2.06
Water (lost at 150° C.)	22.48
Organic matter	1.10
Lime	26.44
Magnesia	.27
Ferrous-oxide	1.31
Sulphuric-acid (combined)	34.93
Phosphoric-acid	1.02
Carbonic-acid	none
Chlorine	trace
Silica, sand, etc.	10.39
(including combined silicic-acid, SiO_2)	2.33)
	100.00

From the above results the substance is evidently composed chiefly of hydrated sulphate-of-lime associated with some silicious matter and minute particles of carbon in the form of soot. The solvent action exerted by rain charged with sulphurous and sulphuric acid derived from the gases and smoke of innumerable chimneys of the surrounding buildings, has after the lapse of two centuries transformed the original carbonate-of-lime of the Portland-stone into sulphate-of-lime, which, in a more or less soluble condition, has been carried by water action and gradually deposited as calcareous tufa or stalagmite on the underside of the coping-stone.

The practical conclusion to be drawn from this research is very obvious, namely, that buildings in large cities, and especially in manufacturing towns, should not be constructed of limestone, which is readily decomposed by the acids existing in the smoke due to the use of coal largely impregnated with sulphur.

Granite and hard sandstone appear much better adapted for city buildings, but stone of a calcareous character was doubtless originally employed on account of its being more readily, and therefore more economically, worked into suitable shape by the stone-cutter.

JOHN HUGHES.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

BUILDING OF H. HACKFELD & CO., LTD., HONOLULU, HAWAII. MR. O. G. TRAPHAGEN, ARCHITECT, HONOLULU, H. T.

MATERIAL of façades: native blue basalt, copper dome, plate-glass windows. Length of frontage on three streets, 423 feet. Interior finish: in general, white quartered oak and mahogany. Counting-room finished in St. Beaume marble, with marble counter fronts and bronze grilles over, and domed frescoed ceiling. Floors of public lobby and corridors are of marble mosaic in elaborate patterns. The building is entirely occupied by the firm for which it was built, and is equipped with private telephone system, conduit system of electric-lighting, three elevators, patent fire-hose reels, fire-escapes on rear, with stand-pipes, patent rolling steel fire-shutters, and the interior construction of floors and partitions is of a form of slow-burning construction.

OFFICE OF THE SAME.

THE SALLE DE LOUIS, PARIS, FRANCE: A RESTORATION BY MM. PAUL GAUDET, JR., AND CHARLES PONDERT.

SEE "Paris Letter" elsewhere in this issue.

THE STEWART–HASKELL FREE LIBRARY, DERBY LINE, ROCK ISLAND, VT. MESSRS. J. T. BALL & G. H. SMITH, ARCHITECTS, BOSTON, MASS.

PROPOSED FIRST PRESBYTERIAN CHURCH, HOMESTEAD, PA. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

[The following named illustration may be found by reference to our advertising pages.]

FUNERARY CHAPEL, PARIS, FRANCE. M. H. BOITEL, ARCHITECT.

THIS plate is copied from *La Construction Moderne*.

NOTES & CLIPPINGS

SOME COURT LABOR RULINGS. — The Missouri Supreme Court, sitting *en banc*, handed down an opinion on March 19 declaring that courts of equity have no power to enjoin labor organizations from enforcing boycotts on corporations. The opinion, rendered by Judge Sherwood, affirmed the judgment of a lower court, which had refused the application of the Marx & Haas Jeans Clothing Company, of St. Louis, for an injunction to restrain Anthony Watson and other officers of a local Knights of Labor organization, and a branch of the United Garment-workers of America in that city, from pushing a boycott. Chief Justice Burgess and Judges Brace, Gantt and Marshall concurred in the opinion, and Judge Robinson dissented. Judge Valliant, who heard the case originally when on the Circuit Bench, took no part in hearing the appeal. The opinion handed down by the Court on March 19 says: "If the labor-unions of the State are not permitted to tell the story of their wrongs, or their supposed wrongs, by word of mouth, or with pen and print, and to endeavor to get other persons to aid them by all peaceable means in securing redress of such wrongs, what becomes of free speech?"

ON April 7, Judge Ferris, in a Wilkes Barre court, rendered an important decision in a boycott case. Last June, J. E. Patterson & Co., of that city, refused to grant the demands of their employés for an increase of wages. The Building Trades Council then declared a boycott against the firm. The Court was appealed to for an injunction to prevent the Trades Council from carrying out its threat. A temporary injunction was granted, and to-day Judge Ferris made it permanent. In the course of his opinion the Judge says: "The boycott is destructive to personal liberty and utterly subversive of all social order, all law and all government, and is therefore unlawful."

IN a Philadelphia court Magistrate Rogers recently discharged Director Haddock and Chief Hand, of the Water Bureau, who were charged with misdemeanor in employing stonemasons in the Water Bureau more than 8 hours a day, in violation of the Act of July 26, 1897. "I think the Legislature, when it passed this Act, gave the workingmen a gold brick," said the Magistrate. "The trouble is the Act does not say that a workman may not agree with his employer to work longer than 8 hours if he wants to, and that is, moreover, beyond the power of the Legislature to say. An analysis of the Act fails to show any words which forbid a workman to work more than 8 hours if he wants to, nor an officer of the State or city to employ a workman more than 8 hours with his consent. It is clear that the Act nowhere expressly forbids either of these things."

THE New York Court of Appeals at Albany, on April 1, handed down a decision, affirming the rights of labor-unions to limit their membership and to refuse to work with non-union men. The Court stood four to three on the question. The prevailing opinion was written by Chief Judge Parker, and concurred in by Justices Gray, O'Brien, and Haight. It was dissented from by Judges Bartlett, Martin, and Vann. The plaintiff, the National Protective Association of Steam-Fitters and Helpers, is an incorporated association, consisting of a few members who worked for lower wages than the members of the defendant associations: the Enterprise Association of Steam and Hot-Air Fitters and General Workers and Motive Power of New York City and vicinity. The defendants, through their walking-delegates, insisted that the contractors should not employ the plaintiff's members, but should employ defendant's members, and in several instances caused a strike of all employés working upon a job, with the result that the plaintiff's men were ousted from employment and defendant's members put in their places. In other instances the defendants made threats that they would strike unless the contractor employed defendant's members instead of those of the plaintiff. Justice Truax, at a Special Term, grantedan in junction, restraining the defendants from striking or making threats, which judgment was reversed by the Appellate Division, the Court of Appeals to-day concurring with the Appellate Division. In his opinion Judge Parker says: "They [workingmen] have the right to strike, provided the object is not to gratify malice or inflict injury upon others, but to secure better terms of employment for themselves. A peaceful and orderly strike is not in violation of the law. A body of men having organized for purposes deemed beneficial to themselves have the right, if they feel it is detrimental to interests of their organization, to refuse to work. Their reasons may seem inadequate to others, but if it seems to be in their interest as members of an organization to refuse longer to work, it is their legal right. So long as workmen must assume all the risk of injury that may come to them through the carelessness of co-employés, they have the moral and legal right to say that they will not work with certain men, and the employer must take their dictation or go without their services. . . . A labor organization is endowed with precisely the same legal right as is an individual to threaten to do that which it may lawfully do."

THE Missouri Court of Appeals gave a decision on March 18 in the case of Froelich, a musician, who was expelled from his union because he rode on boycotted street-cars during a strike, and who sought reinstatement by the Courts in his union. The Court held that when a so-called trade-union becomes the tyrannical master and a monopoly, it puts itself beyond the protection of the Courts, and no member of such a union can have a standing in a court of equity. Therefore it could give Froelich no relief from his expulsion, since the musicians' union was a gigantic monopoly.

WHILE presiding at the recent teamsters'-strike hearing, Judge Braley of the Massachusetts Superior Court said: "The Court rules that a combination by these defendants to regulate their own conduct is allowable and is lawful, though others may be indirectly thereby affected, but if upon this evidence, and it is a fact subsequently to be found and determined, they have combined to do injurious acts expressly directed against the plaintiff in this case, by way of intimidation or constraint of persons employed or seeking to be employed by it, that is unlawful. Intimidation, if subsequently it is found as a fact in this case, is not limited to threats of violence or of physical injury to person or property, though it may and is claimed by the plaintiff in its bill to include both. It has a broader signification, and *there also may be a moral intimidation which is illegal.* Patrolling, picketing, 'blocking,' cutting of harnesses and unhitching horses have elements of intimidation, and if these things were done for the purpose of interfering with the business of the plaintiff, a court of equity may grant relief." — *Exchange.*

DORIAN ANTIQUITIES. — The Prussian Knights of St. John, who were formerly in possession of the island of Cos, the modern Istanköi, have contributed three thousand marks towards the cost of the expedition which is about to make excavations in the island, under the leadership of Drs. Herzog and Vosseler, of Tübingen University, and Herr Necht, of Würtemberg, the architect. The expedition is being organized at the instance of the Imperial Berlin Archæological Institute, which has given five thousand marks for the purpose. A portion of any antiquities that may be discovered will be presented to the Royal Museum of Antiquities at Würtemberg, which also contributes to the cost. Prince Albert of Prussia, Grand Master of the Knights of St. John, has given two thousand five hundred marks towards the cost of publishing a report on the expedition. — *Berlin Dispatch London Standard.*

CHRISTIAN ANTIQUITIES IN THE SOUDAN.—Mr. John Ward, F. S. A., writes us from the Savile Club: "We have all heard of the temples and pyramids at Meroë, but few were prepared for the discovery of ruined Christian cities beyond Khartoum. In the beautiful garden of the palace at Khartoum, I saw a huge stone Paschal lamb, of evident Roman structure. Father Ohrwalder told me that this was brought from the ruins of Soba, on the Blue Nile, 25 miles beyond Khartoum, in Gordon's time, and that he knew the place, which abounded with the remains of Christian temples, and was once the centre of a civilized kingdom. Colonel Stanton, Governor of Khartoum, found me a map of the country round Soba, with the ruins laid down. Since then he has visited the ruined temples himself, and is preparing to have them cleared from the sand, and photographed. About 80 miles north of this there are the extensive ruins of another city — Naga — with fine temples of Roman architecture, avenues of lambs, the same as the one at Khartoum, leading up to them. The inscriptions are in hieroglyphs, while the composite capitals of the columns bear the cross, both at Soba and Naga. The lamb at Khartoum has a long hieroglyph text and the cartouche of some ancient king. This inscription had not been observed before I discovered it on the base under the gravel. So far south, Roman work of Christian times with hieroglyphic texts is a novel combination and demands further research. Since I left Khartoum, Colonel Stanton writes me that he learns from the natives that there are many similar ruins spread all over the country, and, 80 miles east of Khartoum, sculptured rocks and inscriptions, while as far away as Darfoor, tidings of ruins of temples reach him." — *London Times.*

BIRD'S-EYE MAPLE. — What is bird's-eye maple? That is a question which just now seems to be baffling not only people who use furniture made of this particular wood, but even woodworkers themselves. In a recent number of a woodworking magazine an article was published which stated that bird's-eye maple was not a peculiar maple, but simply ordinary maple cut in a certain way. In a recent issue of the New York *Sun* that statement is refuted. It is there stated, on the authority of a wood-worker, that bird's-eye maple and curly maple are both cut only from the logs of the rock maple-tree, *Acer saccharinum*, in which a beautiful lustrous grain is produced by the sinuous course of the fibres. This tree is not at all the common hard maple. It is a hard maple, but is full of little gnarls called eyes. Men looking for bird's-eye maple-logs go through the standing timber and pick out the bird's-eye maple-trees, paying for them from $30 to $50 a thousand feet in the woods. Ordinary hard maple-logs are worth only from $6.00 to $7.00 a thousand feet. It would be impossible to cut a piece of veneer with eyes in it from a common hard maple-log, and it would be equally impossible to cut a bird's-eye maple-log, no matter how you cut it, so that it would not show the eyes. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVI SATURDAY, JUNE 28, 1902 No. 1383

CONTENTS

SUMMARY: —
The Coöperative-Apartment Craze of a Score of Years ago. — The present Rage for Syndicate Building. — The proposed Memorial at Washington to Abraham Lincoln. — Accident to a New York Subway Contractor. — Two Elevator Accidents. — The Origin and Symbolism of Church Ornaments. — M. Bénard made Professor at the Ecole des Beaux-Arts. . . 97
NOTES ON IRON AND STEEL CONSTRUCTION. — VIII. 99
ILLUSTRATIONS: —
House of James B. Castle, Esq., Honolulu, Hawaii. — Staircase: House of James B. Castle, Esq., Honolulu, Hawaii. — A Competitive Design for the Soldiers' and Sailors' Monument, Philadelphia, Pa. — Hanna Hall, Kenyon College, Gambier, O. — Dormitory for Kenyon College, Gambier, O.
Isometric Study: View of Gardens, House for Thomas B. Fitzpatrick, Esq., Brookline, Mass.; — Parlor: House of James B. Castle, Esq., Honolulu, Hawaii. 103
COMMUNICATION: —
The Status of the Lowell Mill-Operative. 103
NOTES AND CLIPPINGS. 103

IT would take a very strong and nearly unanimous appeal from our subscribers to induce us to continue the form of publication which, during the current quarter, has been given experimentally to our International Edition. We are not satisfied with the practical working of the new method, which seemed to have the promise of many desirable possibilities in its favor, and believe that no mistake will be made in returning at the earliest practicable moment to the original form of publication. From the first issue for July, therefore, subscribers to the International Edition will again receive their copy in its familiar blue-covered weekly form.

THE present fashion, we might almost call it a craze, for syndicate building, has much in common with the rage for coöperative apartments which seized New York twenty years ago. At that time, the apartment, or "French flat," had been newly imported from Boston, where it was popular long before it occurred to the New Yorkers that fashionable people could live in anything but a separate dwelling-house, and the new idea was, as usual, dressed in appropriate costume for local acceptance. As an apartment-house on Fifth or Madison Avenue was a much more expensive affair than the modest Hotel Hamilton, or Hotel Agassiz, or Hotel Kempton, which housed the good society of Boston, it was necessary to devise unusual means of financing such an enterprise, and a special Act of the New York Legislature was passed, to enable people to hold a portion of real-estate separated from neighboring portions by horizontal, as well as vertical, divisions. In point of fact, this law was not much used, the device of vesting the title to the structure in a stock-company, ownership of shares in which carried with it the right to occupancy of a certain portion of it, being found simpler. Such stock-companies multiplied, and were, for a time, very successful, a score or more of large houses having been erected in this way. It was the ordinary practice to mortgage the property to about sixty or sixty-five per cent of its value, so that a stockholder, in paying for his stock, took it subject to a lien to at least an equal amount. This circumstance led, perhaps, to the decline of the system. Naturally, the mortgage interest on property of the kind, and the expense of maintenance, always heavy in a first-class apartment-house, required a large income, which was usually provided for by reserving a portion of the apartments in the building to be rented to persons not owning stock; and if tenants could not be found for these apartments, the stockholders had to make up the deficiency. With some of the houses, unfavorably situated, or unattractive in other ways, this state of affairs was not long in coming to pass, and, after a few years of struggling, the mortgages were foreclosed, of course cutting off the interest of all the stockholders. The mortgagees, on assuming control of the property, naturally took what they could get in the way of rent of the apartments, and the competition of the foreclosed houses still further increased the perplexities of the owners of the solvent ones. Now, although there are no more foreclosures, and the better-managed houses are still occupied by the successors of the original stockholders, or by their sub-tenants, no coöperative apartments have been built for many years, and no more are likely to be built, at least in New York.

WHETHER the fashion of syndicate office-building will have a similar career remains to be seen, but there are many reasons why it is desirable to be cautious in following it. As real-estate men know, the office population is very fluctuating. When business is brisk, and new enterprises numerous, offices are in demand; but after a panic, when everybody imagines that no revival of speculation is possible, the promoters of new schemes disappear, leaving their offices vacant. At the same time, the expenses of maintenance continue, and many an office-building has shown, at certain times, a very small margin of income over expenditure. For well-situated and conservatively managed buildings, the chances would always be in favor of a small return on the investment, even in the worst times; but, for those situated at a distance from the business centre, heavily mortgaged and cheaply built, it is quite conceivable that there might come a time when repairs, expenses and mortgage-interest would more than consume the income from rents. Then the troubles of the certificate-holders would begin. The wiser ones would undoubtedly sell their interest at the first sign of danger, preferring to take a small loss, rather than risk a greater one, and those who were left would have to meet the deficiency. It is said that in syndicates of this kind, which are virtually partnerships, the law makes each certificate-holder individually liable for all the partnership debts, and this consideration, while it should be encouraging to the mortgagees, is not likely, in time of distress, to please the richer certificate-holders, and foreclosure would, of course, cut off all subordinate interests in the property, even if it did not leave a deficit to be paid by certificate-holders in addition to the loss of their investment. So far, there has been little trouble of the kind. A few office-buildings, injudiciously financed, have been sold under foreclosure, but the better class have prospered, and their managers, we hope, have been wise enough to lay up a reserve against contingencies.

THE so-called McCreary Bill, authorizing a Commission to prepare plans, and a report on site and design, for the proposed memorial to Abraham Lincoln in Washington, has been passed by the House of Representatives. The members of the Commission thus authorized have been already selected, and have agreed to recommend the site contemplated in the Burnham-McKim-Olmsted general plan for the improvement of Washington, at the intersection of a line drawn through the centre of the Capitol and the Washington Monument with the north bank of the Potomac. In this position, the Lincoln Memorial will not only add immensely to the effect of the Washington Monument, which is now out of relation with anything else, but will serve as an introduction to the bridge which it is proposed to build from this point to Arlington, on the Virginia side. What will be the character of the Memorial is not yet decided, but several suggestions have been considered, and it is hoped that a decision may be made very soon, so that the cornerstone of the structure may be laid on the occasion of the meeting of the Grand Army of the Republic in Washington in the autumn.

EVERY one will regret the last misfortune which has attended the excavation in the Park Avenue section of the New York subway, and is likely to prove fatal to the brave and able contractor for the work, Major Shaler. It will be remembered that, soon after work on this section was begun, a collision took place in the New York Central railway-tunnel near by, by which nineteen persons were killed, and thirty-six injured. Nineteen days later, a quantity of dynamite, stored for use in the work, exploded, nearly destroying the Murray Hill Hotel, killing six persons, and injuring about ninety others. Less than four weeks afterwards occurred the fire in the Seventy-first Regiment Armory and the Park Avenue Hotel, close to the opening of the tunnel, by which seventeen persons were killed, and work on the tunnel greatly interfered with; and, four weeks later still, a slip of the rock excavation damaged four houses on Park Avenue to the amount of about one hundred

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

thousand dollars. It is said that Major Shaler, as contractor, was financially ruined by the dynamite explosion and the giving way of the ledge, but he bravely persevered with the work until, a few days ago, while standing in the excavation with the engineers of the Rapid Transit Commission, he was struck by a stone falling from the roof of the tunnel, forty-five feet above him, his skull fractured, and his back seriously injured, so that paralysis has set in, and it is believed that he cannot recover.

TWO elevators, crowded with people, fell recently in New York, fortunately without fatal consequences. In one case, twenty-two men and three girls crowded into the elevator of a clothing-factory. The weight seems to have been too much for the machinery, for, although the ropes did not break, the car descended so rapidly as to tear away the iron gates at the landings, striking the bottom of the shaft with such force as to injure seriously one man and a little girl of eleven, and cut or bruise about a dozen others. In the second case, an elevator in Macy's department-store, carrying a large number of persons, fell from the third story to the cellar. Eight or more of the passengers were injured, but none very seriously. In neither case is anything known, as yet, of the cause of the accident.

THE *Builder* gives a report of a discourse on the "Origin and Symbolism of Church Ornaments," delivered not long ago in London, before the Church Crafts League, which suggests the idea that a book on this subject, treated in the modern critical spirit, and with the aid of modern archæological knowledge, might be extremely useful, not merely in elucidating a subject of real importance, but in dissipating the clouds of sanctimonious absurdity by which it has been surrounded by the people who find in their own illuminated intelligence the explanation of the symbolism which they profess to discover everywhere. Of inspired expounders of this class there seems to be no end, and the incalculable mischief that they do to rational religion might perhaps be better counteracted by a book, written with real learning, and decent respect for historical truth, than in any other way. Of course, the foundation of all modern works on religious symbolism is the book of Durandus, but the worthy Bishop of Mende, if he was too good a Christian to presume to find in his own moral consciousness the explanation of the sacred mysteries, was very credulous, and lacked the wider and more exact knowledge of antiquity, and of ecclesiastical history, which we now possess; so that the subject might very well be treated as one altogether new. As one of the elementary questions for discussion might be mentioned that of the orientation of churches, which, although certainly as practical a subject as history or architectural ecclesiology affords, is in a state of almost hopeless confusion. We know the facts, that the churches of northern Europe, for at least fifteen centuries, have almost invariably been planned with the altar at the east end, and that the feeling in favor of this disposition is still very strong among the races of Germanic descent, while the churches of Italy, the cradle of Christianity, show an uncertain orientation, the altar being quite as frequently at the west as at the east end; and we know, again, that many of the early Greek temples had their sanctuary at the west, their principal door opening toward the east; while the entrance-doors of the Pyramids of Egypt open toward the north; but what is the explanation of all these dispositions, or whether they have any connection with each other, remains to be discovered. The modern view, that the early Greek temples were devoted to a modified and poetic form of sun-worship, and that the orientation was such that the first rays of the sun, on the morning of the longest day in the year, fell, through the open door of the temple, upon the statue of the god at the other end, is both reasonable and scientific, and investigation and inference, of the kind which has led to this explanation of the orientation of the Sicilian and Greek temples, might be applied to other religious traditions with great profit. In the same way, the inclination and direction of the entrances to the Pyramids are such that, when they were built, the North Star could be seen at all times from them, and this circumstance at least suggests interesting possibilities in connection with the elucidation of Egyptian history. On the other hand, when we come to Christian churches, we fall at once into a fog of ignorant assumption. We are told that the Christians put their altars in the east, because the heathen had theirs in the west; a theory which loses, to say the least, much of its force in view of the circumstance that the largest and oldest Christian churches have also their altars in the west. We have also been told, with some probability, that, as the ancient inhabitants of northern Europe were originally sun-worshippers, they were accustomed, in their open-air ceremonies, to bow down to the rising sun, which they saw, naturally, in the east; and that, in consequence, after they became converted to Christianity, they found it more consonant with their inherited religious habits to worship their new Divinity also with their faces turned toward the east. This hypothesis is open to various objections. While it is true that the ancient inhabitants of Europe were probably sun-worshippers, they were quite as much so in the South as in the North. In fact, some of the peculiar rites of sun, or, at least, of fire worship are practised to this day in the Pyrenees, as well as in the remote parts of Brittany, and, more particularly, in Sardinia; yet in none of these regions has the eastward orientation of Christian churches ever been much regarded. Moreover, even if the Christian missionaries, who regarded the heathen gods as demons, had been willing to preserve the heathen disposition of religious structures, merely substituting the Cross for the grinning image of Thor or Loki, which is extremely unlikely, it remains to be explained how the sun-worshippers could have accepted, as a substitute for an enclosure open to the rays of the rising sun, a building which often had not even a window to the eastward, and from which, with the curious, and possibly significant, exception of England, the sun at early morning could not be seen at all.

IN regard to many other details of church arrangement there is the same need of common-sense discussion. The lecturer before the Church Crafts League informed his audience, as a specimen of the way in which "the highest thoughts" were expressed by symbols, that "Going back to the early Egyptians, they found the crocodile deified, and when they inquired why, they found the crocodile could see through the muddy waters of the Nile, and was a tongueless animal, and consequently it was taken as symbolic of the all-seeing eye of God and the voiceless God." How the distinguished canon explained, on these principles, the symbolism of the cat, which was deified by the Egyptians at least equally with the crocodile; or how he made his interpretation of the symbolism of the crocodile fit the circumstance that the animal, if it has no tongue, has a very loud voice, while its capacity for seeing through muddy water is by no means proved, we will not undertake to say; but the lover of truth, in psychological as well as historical science, is not likely to derive much edification from such discourse. Coming down to matters architectural, the distinguished lecturer informed his audience that the chancel-screen was "symbolic of the drawing back of the veil," and, "therefore," "in the early days the screens became the finest objects of art in the cathedrals." As a matter of fact, in "the early days" of the Church there were no chancel-screens, and the cathedrals of the most ancient foundation, which might be supposed to retain most fully any symbolical traditions, have never had any. On the contrary, the high screen peculiar to the Northern churches, in all probability, was originally erected to protect the Benedictine missionaries during service from assault on the part of the more zealous heathen in the half-converted congregation; and its subsequent development as an ornamental feature simply followed the general artistic development of church architecture. It may be observed that ecclesiastics, although they seem to think that symbolic mysticism is good for the laity, pay very little attention to it themselves, and the slaughter of a priest at the altar, which was by no means an infrequent incident of the conversion of the Northern tribes, was far more likely to have suggested the building of a stout fence across the church than any consideration of "veils." Even the reverend lecturer himself showed a little of the utilitarian spirit which, fortunately for their flocks, is really more congenial than mysticism to the clerical mind, by suggesting that the ancient Hebrews, although they were "of a highly poetic nature," in his opinion, used incense "as a disinfectant." The idea that incense could be advantageously replaced by carbolic acid is one which will strike a good many people as novel, if not highly poetical.

THE friends of M. Bénard, the distinguished winner of the competition for the buildings for the University of California, who, as our readers know, resigned the commission, on account of the difficulty of attending to his duties in Paris and California at the same time, will be interested to learn that he has been appointed Professor of Elementary Architecture in the School of Fine-Arts, in place of M. Coquart, deceased.

NOTES ON IRON AND STEEL CONSTRUCTION.[1]—VIII.

HAVING decided upon the structural rolled shapes that are to be used in the column, and the best arrangement for them in order to secure an economical column-section, and one that is readily utilized for rigid girder and beam connections, it is necessary to consider the design for the base of the

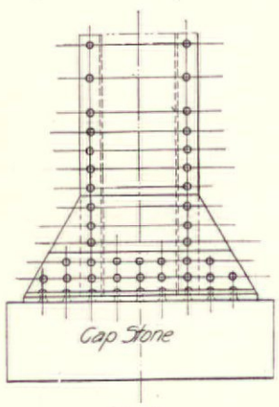


Fig. 51.

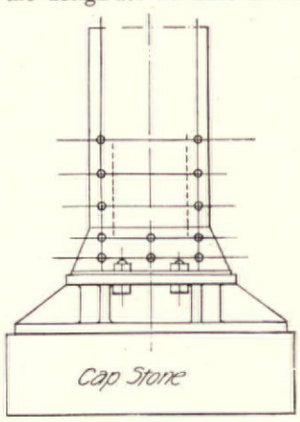


Fig. 52.

column, the manner in which the floor-beams and girders are supported, and the spacing of the rivets, that the rolled shapes and plates may be adequately secured to each other so as to act in unison under the load.

The base of a structural-steel column may rest either directly upon the top of the capstone of the foundation-pier, or upon a cast-iron base-plate. In any case, the end of the column must have ample bearing-area, and must be reënforced so that there is no danger of failure by the plates and rolled shapes separating or spreading at the ends.

When the column rests directly upon the capstone, the form of base shown in Figure 51 is usually adopted, and consists of a heavy bearing-plate, from $\frac{5}{8}$ inch to 1 inch in thickness, held securely to the end of the columns with angle and gusset plates, as designated, the rivets holding the plate to the column being countersunk and chipped on the under side so that a level bearing may be obtained for the column upon the capstone.

Where the structural-steel column depends upon a cast-iron base for the distribution of the pressure upon the capstone or pier, the design shown in Figure 52 is frequently adopted. It will be noted in this figure that the column is held to the cast-iron base with the necessary bolts through angle clips, riveted to the end of the column. It is not usual, however, to secure a cast-iron base to the capstone or pier by anchor-bolts, for this practice is now considered entirely unnecessary. Where a column rests in this manner upon a cast-iron base it is necessary to face both the top of the base and the end of the column. It is not, however, usual to rivet to the bottom of such columns a steel-plate bearing between the end of the columns and the top of the cast-iron base-plate; the usual column is faced across after the clips have been put in place, the ends of the columns, and clips as well, being finished. An exception, however, to this occurs with the Phœnix columns, as shown in Figure 53. Here the end of the column only bears upon the base-plate, the clips being kept $\frac{1}{8}$ inch or $\frac{1}{4}$ inch back from the end of the column, so that none of the bearing is transmitted through the rivets holding them. The end of such a column requires little reënforcement, and the clips add nothing to its bearing-strength; besides, the difficulty in finishing the clips, as well as the end of the column, would preclude such work being done. The elevation in the figure shows the clips kept back from the end of the column, and clear of the face of the base-plate.

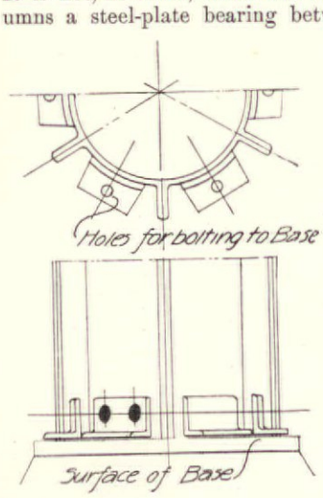


Fig. 53.

The floor-beams may be secured to the column in many ways, and great care and ingenuity have been exercised in the design of these connections. It has become the practice, however, to endeavor to provide bearings for these beams upon a bracket riveted to the column, and to make no attempt to support the beams by the web and through the shear of rivets

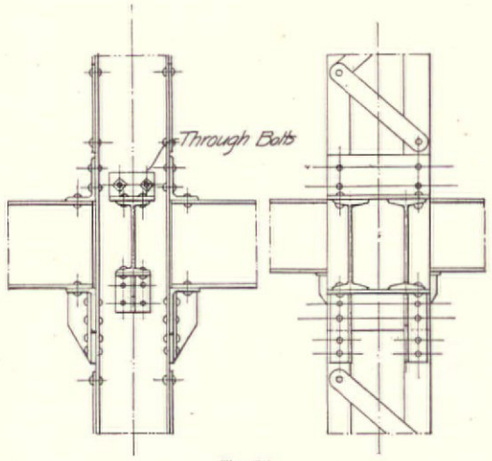


Fig. 54.

through the web and angle-clips riveted to the column. The most practical connection, and one generally used, is designated in Figures 54 and 55; in the former is shown the principal girder and beam connections to a channel-bar column, while in the latter is designated the same character of floor-beam connections to a Z-bar column. The brackets supporting the column are made of angle-iron reënforced by a web, likewise formed of angles; the beams are held in place, top and bottom, by rivets through angle clips. This form of connection is most rigid, as it gives a framing which provides considerable resistance against lateral motion and offers the greatest possible leverage for this resistance where knees or other forms of wind-bracing are not used.

This connection is far preferable to that shown in Figure 56, for while the latter has the advantage of being economical, it certainly offers less rigidity to lateral motion.

Outside columns of buildings must have specially designed connections for the support of the curtain-walls. These connections are usually quite complicated, as, besides providing support for the curtain-walls, there is usually required adjacent thereto a connection for the floor-girders. The usual and simplest connection is designated in Figure 57.

Besides the design of the beam-connections, the splicing of the columns in the tiers of the several stories requires careful consideration. Owing to the difficulty in shipment and handling, and also to the fact that structural shapes are limited in length, the columns must be spliced at several places throughout their length from foundation to roof. Numerous splices should be avoided, and structural-steel columns should be designed of as great a length as convenience in shipment and

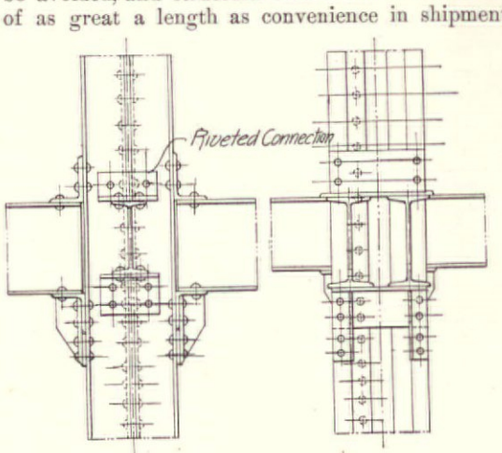


Fig. 55.

erection will allow. Where it is possible, a column should run through several stories without a splice, and the splices upon the different sets of columns should break joints. Where it is necessary to splice the column it is usual to make the connection between the upper and lower column close to a beam-connection, in order to facilitate the erection of the column above

[1] Continued from No. 1379, page 70.

and the riveting of the splice. In fact, the splice-plates often carry the beam-connections as designated in Figure 58. The ends of the abutting columns should be milled or faced, and it is usual to place between them a plinth-plate, as designated at *a* in Figure 58; the flat sides of a column are held between two splice or fish plates which extend past the joint for from 18 to

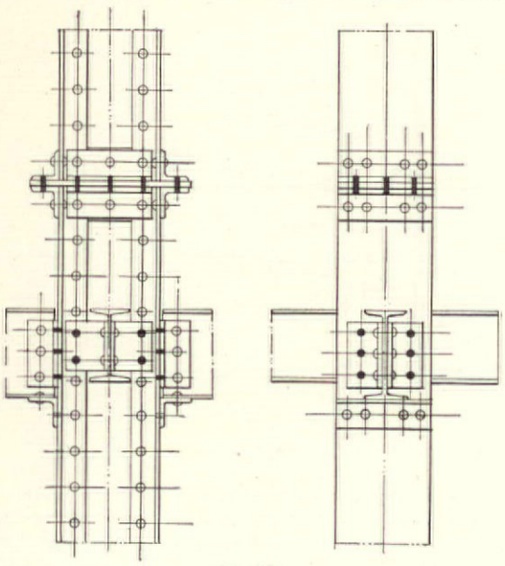


Fig. 56.

24 inches upon each column. These plates are securely riveted, usually to the lower column in the shop and necessarily to the upper column in the field. In angle columns the plinth-plate and connecting angles are sometimes omitted, and instead of the side-splice plates web-splice plates are used. This makes a very rigid connection, but it is not frequently employed.

In spacing the rivets throughout the length of the column, the rivets holding together the several rolled shapes forming the shaft of the column should be spaced at the minimum pitch for a distance of from 2 to 3 feet from the bottom and adjacent to the floor-beam and girder connections; through the balance of the shaft of the column they may be spaced the maximum distance for compression-members, namely sixteen times the thickness of the thinnest outside plate, provided such a thickness does not exceed 6 inches.

At the beam and girder connections the brackets should be

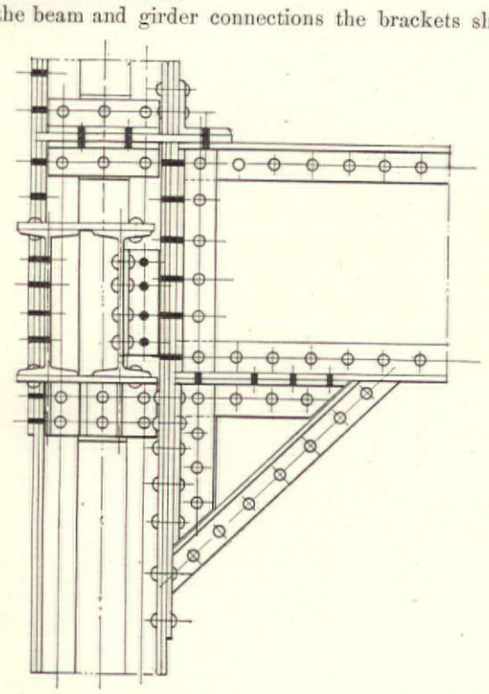


Fig. 57.

held to the shaft of the column with sufficient rivets so that their safe allowable shearing-strength will take care of the reactions at the ends of the girders. In designing connections a rivet should never be considered in tension. Where a connection requires by its design such a means of securing a plate, angle or clips, bolts should always be used. The reason for this is that very little dependence can be placed upon the heads of rivets, especially when driven in the field, as they are often driven at a low heat and are partially crystallized, in consequence, where the shank joins the head.

If there are any bending-moments upon gusset-plates forming an important member of a connection, they should be carefully studied and provided for by riveting or bolting. The rivets in splice-plates are spaced from $2\frac{1}{2}$-inch to $3\frac{1}{2}$-inch centres. The principal consideration in designing the rivet-spacing in such connections is to provide sufficient resistance in the rivets to equal the strength of the net section of the plate.

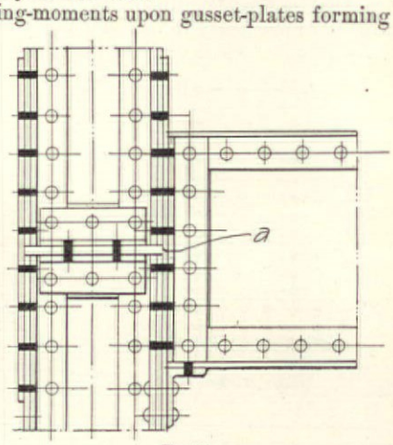


Fig. 58.

There is no more important matter in the design of tall buildings, outside of the foundations, than the lateral or wind bracing. It is a well-conceded fact that the floor-systems and the usual fireproof partitions as constructed in high buildings do not provide adequate lateral resistance against vibration of moving machinery, jars and shocks from accidental causes, and particularly from the wind-pressure upon the large area which the sides of such buildings offer. The different methods of bracing a building of the skeleton-construction type are practically five, and they may be enumerated as follows: —

First. — The connections of the floor-beams and girders to the columns may be so rigid as to provide all of the stiffness required. Rigidity is obtained in such connections when the floor-principals are of deep beams or plate-girders, securely

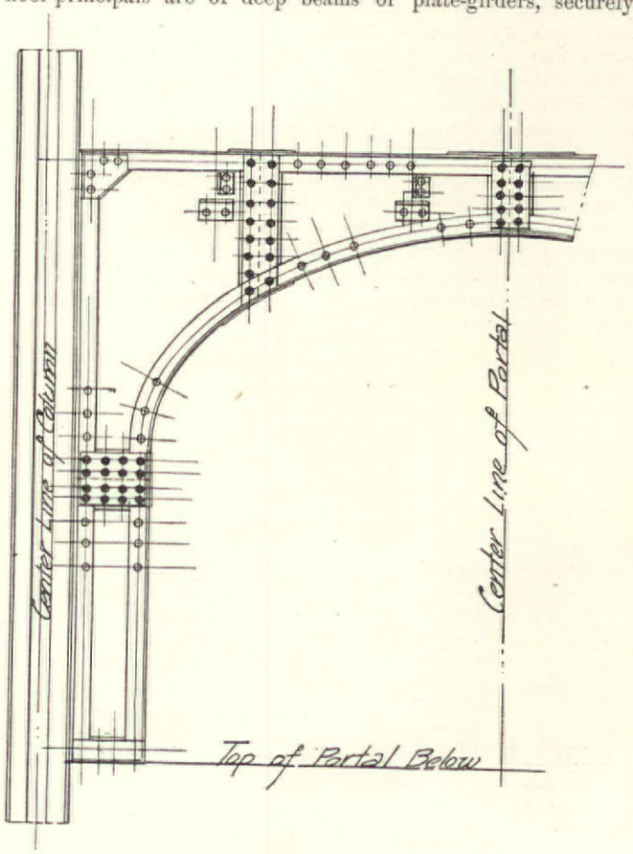


Fig. 59.

bolted or riveted to the columns. For buildings whose height is limited to two and one-half times their least base, it is probable that such connections offer the necessary resistance to lateral movement. Such connections may be employed in buildings as high as three times the length of their least base

when the exterior walls are substantially built, and when the building is braced by several brick partitions.

Second. — The most usual form of lateral bracing for buildings of moderate height is the gusset-plate or corner-brace.

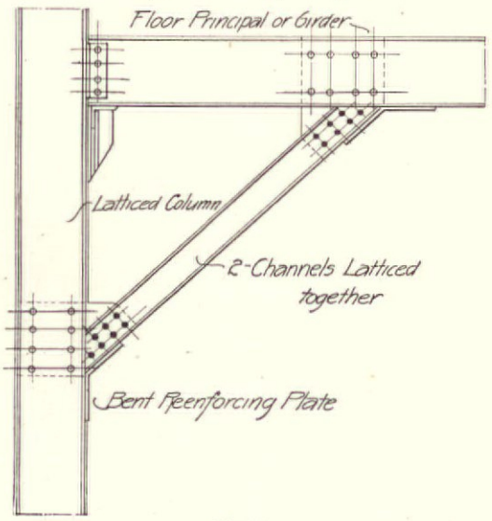


Fig. 60.

This consists of bracing the floor-principals to the column at its junction with this member by means of a triangular plate, usually reënforced with angles, extending at an angle of 45 degrees with the flange of the beam or girder, and the vertical axis of the column. A typical detail for such a connection is shown in Figure 57.

Third. — A system of lateral bracing has been evolved from the gusset-plate, which consists of a steel arch formed between the structural-steel columns, as designated in Figure 59. This detail of construction is known as portal-bracing, and is used in the lower stories or other certain sections of very high buildings. It furnishes great rigidity, but the cost is considerable, and it is open to the objection that it can only be used where the portal or archway is a feature of the architectural decoration.

Fourth. — A system of knee-bracing that is sometimes used is shown in Figure 60. It is efficient, but produces great bending-stresses upon the columns, a stress which is always an objection upon members subjected to compression, and of as much importance as the columns in a tall building.

Fifth. — Sway-bracing, which connects the cap of one column with the foot of the other by means of tension-rods crossed

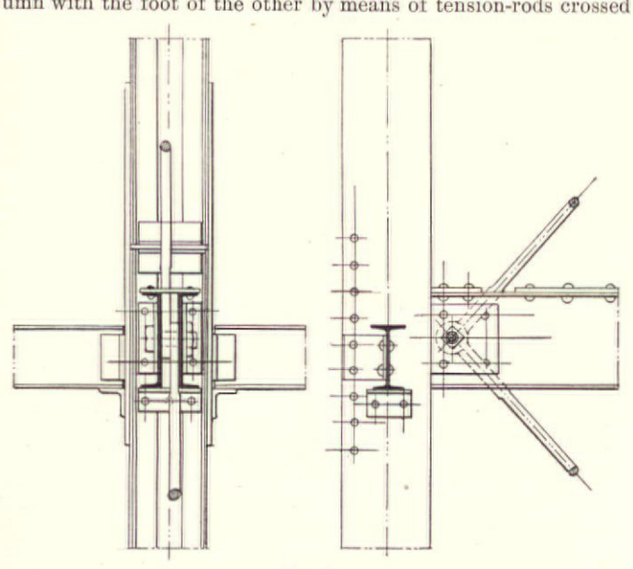


Fig. 61.

diagonally between the panels formed by the columns and the floor-principals, is, undoubtedly, most economical in material and construction. It makes of each set of columns a cantilever truss, its support being the foundation of the building, and its load the pressure of the wind against the area depending directly or indirectly for lateral support upon these columns. The objection to this system of bracing exists in the fact that the diagonals or tension-rods are an inconvenience in placing of doors or other openings; but usually this system of bracing is arranged so that the tension-rods or supports are contained within a partition. This type of bracing is shown in Figure 61.

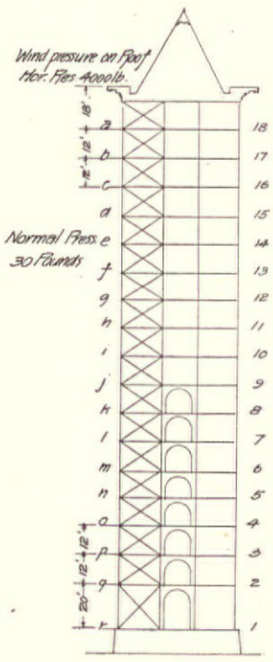


Fig. 62.

It is not necessary in tall-building construction to place a lateral bracing in bay, but it is usual to provide a system of bracing at several points throughout the length of the building. In a narrow building having a length of 100 feet or so, and a considerable height, it is usual to provide lateral bracing between two tiers of columns near the centre of the building. In a building of great length and of extreme narrowness, several systems of bracing would be required, which would be placed about one-fourth of the distance from the end of the building each way. In the location of the bracing much depends upon the situation of the building, and upon the plan, or interior arrangement — that is, the position of the partitions, or hallways.

In determining the stresses in the bracing for high buildings it is usual to assume a lateral wind-pressure of from 30 to 40 pounds per square foot of vertical surface. Since it has been determined that the maximum wind-pressure of 40 pounds upon a vertical surface is seldom realized, and is hardly probable, even if attained, to extend over a large surface, a pressure of 30 pounds per square foot is usually adopted. The stresses in the wind-bracing are maximum when the direction of the wind is normal to the external wall — that is, in a plane parallel with the bracing. In the consideration of the stresses in a braced frame of this character, any rigidity from the floor-construction or partitions that might be given to the building must be disregarded, for they are indeterminate. The floor systems can, however, be depended upon to transmit the direct horizontal shear due to the wind. Since even a pressure of 30 pounds per square foot is seldom attained, and also because, while the lateral rigidity imparted by partitions and floors must be disregarded, it still exists, and a low factor-of-safety is used in the design of the wind-bracing. The factor-of-safety usually employed is 3.

The method of determining the stresses in the several forms of wind-bracing differs somewhat, and though the solutions assume theoretical conditions, any errors are upon the side of safety. The determination of the stresses in the several methods of bracing may be taken up successively as follows: —

Before the stresses in any system of wind-bracing can be computed, it is necessary to determine the horizontal shear at each story due to the wind-pressure, acting normal to the exposed surface of the side of the building.

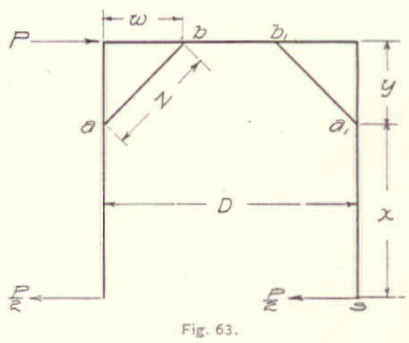


Fig. 63.

This shear is practically the same as would exist from a uniform load on a cantilever girder and is the accumulation of the loads at each story or tier of beams. For instance, in Figure 62 let the skeleton-diagram represent a cross-section through an eighteen-story building. The horizontal shear at the top floor is that due to the wind-pressure on the surface above *a* and including any horizontal pressure upon the parapet-wall or the sloping roof, but the shear horizontally at *b* is not that alone on the surface included between *a* and *b*, but includes as well the shear accruing from above the point *a*. Likewise, the horizontal

shear at c is equal to the pressure on the area from b to c, including the shears at a and b respectively, while the shear at the point d is equal to the pressure upon the area $c\,d$ plus the sum of the shears at c, b and a.

Assume that the length of the exposed surface on the side of the eighteen-story building shown in the figure is 20 feet and that the distance between floors is 12 feet, excepting the bottom story, which is 20 feet high, and the top story, which is 18 feet to the top of the parapet-wall, also that the horizontal wind-pressure per square foot of vertical surface is 30 pounds and that the pressure upon the sloping roof which must be taken care of by the bracing is 4,000 pounds. The horizontal shear at the several stories determined by the notation just described will then be as follows: —

Shear at point a = 18 × 20 × 30 + 4,000 = 14,800 pounds.
Shear at point b = 12 × 20 × 30 + 14,800 = 22,000 pounds.
Shear at point c = 12 × 20 × 30 + 22,000 = 29,200 pounds.
Shear at point d = 12 × 20 × 30 + 29,200 = 36,400 pounds.
Shear at point e = 12 × 20 × 30 + 36,400 = 43,600 pounds.
Shear at point f = 12 × 20 × 30 + 43,600 = 50,800 pounds.
Shear at point g = 12 × 20 × 30 + 50,800 = 58,020 pounds.
Shear at point h = 12 × 20 × 30 + 58,020 = 65,400 pounds.
Shear at point i = 12 × 20 × 30 + 65,400 = 72,600 pounds.
Shear at point j = 12 × 20 × 30 + 72,600 = 79,800 pounds.
Shear at point k = 12 × 20 × 30 + 79,800 = 87,000 pounds.
Shear at point l = 12 × 20 × 30 + 87,000 = 94,200 pounds.
Shear at point m = 12 × 20 × 30 + 94,200 = 101,400 pounds.
Shear at point n = 12 × 20 × 30 + 101,400 = 108,600 pounds.
Shear at point o = 12 × 20 × 30 + 108,600 = 115,800 pounds.
Shear at point p = 12 × 20 × 30 + 115,800 = 123,000 pounds.
Shear at point q = 12 × 20 × 30 + 123,000 = 130,200 pounds.
Shear at point r = 20 × 20 × 30 + 130,200 = 142,200 pounds.

When such a calculation has been made and the resulting horizontal shear has been obtained as above, and when the type of bracing has been decided upon, the calculation for the size of the several members entering into the design of this element in the structure may be found from the following formulas for the different cases.

Case I, the Gusset or Knee-brace. — A skeleton diagram of this system of bracing is designated in Figure 63 and the accumulated wind-pressure at the story under consideration is represented by p. This force p is assumed to be transmitted equally to the foot of the uprights or columns, so that at these points there will be a reaction equal to $\frac{p}{2}$ acting in opposition to p. The force p acting at the top of the frame tends to distort the panel to the leeward, and the result of this tendency is to create tension in the member $a\,b$ and compression in the member $a_1\,b_1$, and these forces while of different kinds are assumed as equal, and as there is under ordinary conditions as much likelihood of the wind blowing from one side of the structure as the other, whether gussets or knee-braces are used they must be proportioned to resist tension and compression. Under tension the member $a\,b$ tends to pull downward upon the floor-beam or girder at b, and under compression $a_1\,b_1$ tends to push the beam or girder upward at the point b_1. These forces require opposing reactions at these points, b and b_1, which must be furnished by the stiffness of the beam against flexure so that the wind-pressure acting on the frame causes bending in the floor beams or principals. Similar forces are exerted by the knees or angle-braces at a and a_1, so that the columns are subjected to bending as well as the floor-principals. Besides these several forces and their attending stresses the horizontal wind-pressure p tends to revolve the entire structure about the point s and, in consequence of the overturning tendency the left-hand, or windward, column is subjected to an uplifting tendency which must be resisted by tensile stress, while the right-hand, or leeward, column is subjected to a pressure corresponding in amount to the tension in the windward column and which creates additional compression in this column other than that due directly to the statical load from the live and dead floor loads.

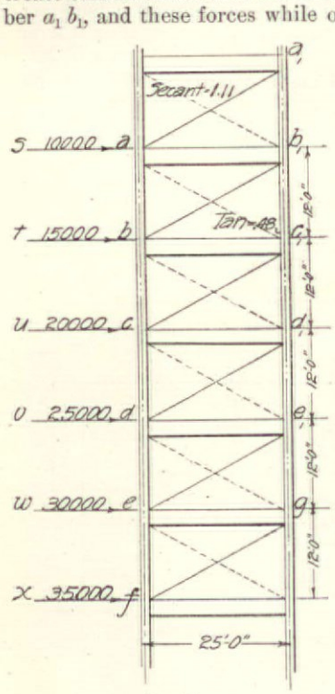


Fig. 64.

The amount of these several forces or stresses created in the different members may be determined by the following formulas in which the notation used in Figure 63 has been adopted in the expressions: —

Knee-braces. — Tension or compression $= P\left(\frac{1}{2} + \frac{x}{4\,y}\right)\frac{z}{w}$.

Columns. — Tension or compression $= P\left(y + \frac{x}{2}\right)\frac{1}{D}$.

Columns. — Bending-moment $= P\frac{x}{4}$.

Girders. — Tension or compression $= P\left(1 + \frac{x}{4\,y}\right)$.

Girders. — Bending-moment $= P\left(\frac{1}{2} - \frac{w}{D}\right)\left(y + \frac{x}{2}\right)$.

These formulas being exceedingly simple in their application need no examples for their demonstration. After the required stresses in the several members are obtained they may be proportioned by the rules and formulas for columns, beams or tension-members. The dimensions of the girders necessary to sustain the floor-loads must be increased sufficiently to take care of the bending-moment due to the wind, and in proportioning the columns the unit compression for the combined dead, live and wind loads must not exceed the unit compression allowed by the following formulas: —

For high buildings $s = 20{,}000 - 75\frac{l}{r}$.

For shed including mill buildings $s = 18{,}000 - 75\frac{l}{r}$.

In both of these formulas r equals the least radius-of-gyration and l the length of the column in inches.

By inspection of the bending-moment in the column at a and a_1, it would seem that the bending-moment would equal $\frac{p\,a}{2}$, but it must be remembered that the columns are rigidly fixed at the top and bottom so that the bending-moment at a and a_1 is about one-half this amount, or $\frac{p\,a}{4}$.

Case II, Sway or Diagonal Wind-bracing. — The skeleton of this system of bracing is shown in Figure 64, and by inspection it is clearly evident that where the diagonals are designed only to resist tension only one set is in action at the same time; the set not in action when the wind is to the left is shown by dotted lines.

The calculation for this system of bracing is quite simple and, as previously stated, involves the principles by which the stresses in a trussed cantilever are obtained.

The accumulation of the loads at the several stories are first found as previously described. Then referring to Figure 64, which shows a cross-section through a portion of a sway-braced building, the loads are as designated at $s\,t\,u\,v\,w$ and x, and these loads are the amount of the compressive stress transmitted by the floor-system and for the resistance of which additional section must be added to the principal beams or girders connecting the columns, unless it is assumed that the floor construction will provide sufficient resistance.

The stresses on the sway-rods bear the same ratios to the horizontal stresses or the stresses in the horizontal members as their length is to the length of the horizontal members. So that if the width of the building or the distance between centres of columns in a plane parallel with the bracing is considered as the radius, then the diagonal will equal the secant of the angle made by the diagonal with the horizontal members.

In the instance designated in Figure 64, the length of the diagonal is theoretically equal to $\sqrt{12^2 + 25^2}$, or 27.73, and the ratio between this length and the width of the building or the distance between centres of columns is equal to $\frac{27.73}{25}$, or 1.11.

The stresses in the diagonal members $a\,a_1$, $b\,b_1$, $c\,c_1$, etc., referring to the figure, will then be as follows: —

Stress in diagonal aa_1 = 10,000 × 1.11 = 11,100 pounds.
Stress in diagonal bb_1 = 15,000 × 1.11 = 16,650 pounds.
Stress in diagonal cc_1 = 20,000 × 1.11 = 22,200 pounds.
Stress in diagonal dd_1 = 25,000 × 1.11 = 27,750 pounds.
Stress in diagonal ee_1 = 30,000 × 1.11 = 33,300 pounds.

With the wind on one side of the structure as designated in the figure, and where the construction is similar to a cantilever-trussed girder with its support at the foundations, the columns at the windward side are in tension, while the columns at the leeward side are in compression. These stresses in the columns must be provided for in their design, and their increment bears the same ratio in each tier to the amount of the horizontal stress as the height of the columns from brace-connection to brace-connection bears to the width of the building or the distances from centre to centre of columns.

The length of the column with respect to the width of the building is equal to the tangent of the angle made by the diagonal with the horizontal, and the value of the tangent in this instance equals $\frac{1}{2}\frac{2}{3}$, or .48, so that the stresses in the columns, whether compressive or tensile, are obtained by the following calculations: —

Stress in ab = 10,000 × .48 + Increment = 4,800 pounds.
Stress in bc = 15,000 × .48 + 7,200 = 12,000 pounds.
Stress in cd = 20,000 × .48 + 9,600 = 21,600 pounds.
Stress in de = 25,000 × .48 + 12,000 = 33,600 pounds.
Stress in ef = 30,000 × .48 + 14,400 = 48,000 pounds.

In the design of the details for sway-bracing or diagonal-bracing the pin-connections at the ends of the diagonals should be carefully proportioned to resist both bending and shearing. Turn-buckles should be provided on all sway-rods and preferably they should be placed about 3 feet above the floor so that they may be conveniently tightened during erection. Where it is necessary to omit a diagonal in order to provide a door or window opening, the remaining rod in the panel should be proportioned for compression as well as tension.

Case III, Portal-bracing. — The principles of determining the stress in this system of bracing are much the same as those employed in the calculations of Case I for a gusset-plate or knee-brace, as it is readily observed that the portal-bracing is merely a form of the knee or gusset-plate bracing.

The horizontal reactions at the foot of the column in each tier are equal to $\frac{p}{2}$ when p equals the horizontal at the floor-level above. This reaction produces a bending-moment throughout the portal which may readily be determined by the principles of moments and it only remains to provide sufficient section throughout the portal to resist the resulting bending-moments. Besides these bending-moments, as in the case of knee-bracing, there is tension in the windward column and compression in the leeward one which is amply provided for in the large amount of excess metal necessary to employ in this type of bracing.

M. M. Sloan.

[To be continued.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF JAMES B. CASTLE, ESQ., HONOLULU, HAWAII. MR. O. G. TRAPHAGEN, ARCHITECT, HONOLULU, H. T.

FRAME-BUILDING situated on the ocean-beach at Diamond Head, near Honolulu. Finish throughout the interior is hard woods, including mahogany, curly birch, bird's-eye maple, native koa wood, curly redwood and oak, etc. The dimensions of large drawing-room, or salon, on first floor are 50′ x 60′. A feature of the house is the continuous *lanais*, or verandas, on each story, overlooking the ocean. The plumbing, electrical equipment and decoration of this building are of the finest character, expert workmen having been brought to Honolulu from New York to execute these branches.

STAIRCASE: HOUSE OF JAMES B. CASTLE, ESQ., HONOLULU, HAWAII. MR. O. G. TRAPHAGEN, ARCHITECT, HONOLULU, H. T.

A COMPETITIVE DESIGN FOR THE SOLDIERS' AND SAILORS' MONUMENT, PHILADELPHIA, PA. MR. ELLIOT LYNCH, ARCHITECT, AND MR. FERNANDO MIRANDA, SCULPTOR, NEW YORK, N. Y.

HANNA HALL, KENYON COLLEGE, GAMBIER, OHIO. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

DORMITORY FOR KENYON COLLEGE, GAMBIER, OHIO. MR. C. F. SCHWEINFURTH, ARCHITECT, CLEVELAND, O.

[The following named illustration may be found by reference to our advertising pages.]

ISOMETRIC STUDY: VIEW OF GARDENS, HOUSE FOR THOMAS B. FITZPATRICK, ESQ., BROOKLINE, MASS. MR. WM. G. PRESTON, ARCHITECT, BOSTON, MASS. MR. FRANKLIN BRETT, LANDSCAPE ARCHITECT; — PARLOR: HOUSE OF JAMES B. CASTLE, ESQ., HONOLULU, HAWAII. MR. O. G. TRAPHAGEN, ARCHITECT, HONOLULU, H. T.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE STATUS OF THE LOWELL MILL-OPERATIVE.

Boston, Mass., June 23, 1902.

To the Editors of the American Architect: —

Dear Sirs, — In your review of the conditions of the cotton-factories of Lowell you have stated the conditions under a misapprehension. You remark that the cotton-manufacturers thought it necessary in order to reduce the cost of production to lower wages to a point which would attract only the most destitute and ignorant operatives. The facts are that when cotton-manufacturing had become well established in Lowell, it was a step in advance for the daughters of New England farmers to leave the isolated, arduous life of the farm and to enter the factory, where they worked 13 hours a day in a low-studded, ill-ventilated, badly-lighted and badly-heated building. The machinery, being far from automatic, required the constant attention of a very intelligent person. In 1840 the average earnings of all the hands — men, women and children — in one of the best of the mills of the Lowell class averaged $175 a year. The average product per hand was less than 10,000 yards a year of 36-inch heavy sheeting. In what purports to be the same mill, of which nothing but a part of the foundation is the same, a high-studded, well-lighted, well-ventilated and moderately-heated building, the foreign operatives of to-day, who could not have worked the machinery of 1840, are now employed 10 hours a day with Saturday afternoon free, earning double the wages per hour, very nearly double the wages per day, as compared with the farmers' daughters of 1840, the average product per hand being nearly 40,000 yards a year. The cost has been diminished, the wages have been augmented, the price has been lessened, the profit required per yard to yield six per cent upon the capital has been reduced to about one-fifth of what it was in 1840. The farmers' daughters of New England and others of similar type and capacity have passed out of the factory into much less arduous and more attractive work at very much higher wages.

Progress in all these directions has been continuous, decade by decade, throughout the sixty years, subject to occasional fluctuations in times of commercial depression. That is the law of competition under which the working-people of the country, in the sense in which that term is commonly used, secure to their own use and enjoyment an increasing share or proportion of a constantly increasing product, this law only being interrupted in its course by the interference of trades-unions in their effort to keep the standard of earnings at the standard of the least capable among the workmen and women, attempting to prevent the capable from reaping the reward of their own superior ability. Yours very truly, Edward Atkinson.

NOTES AND CLIPPINGS

Decrease in Number of New York Stables. — A census taken by the Department of Health of the number of horses and stables in the city shows that there has been a decrease of 8,660 in the horse population from December, 1896, when it was 73,746, to June, 1902, when it is 65,086. The number of stables in December, 1896, was 4,649, and in June, 1902, 3,326, a falling off of 1,323. — *N. Y. Evening Post.*

Music and "Frozen Music." — George R. McKenzie, a sewing-machine manufacturer, built two Presbyterian churches in Jersey City and gave them to the congregations on the agreement that no musical instruments should ever be heard within their walls. The prohibition was fatal to both churches. The congregations dwindled down and down, and the last of them has just been closed because of non-support. Both buildings will be sold and the money used in aid of other Presbyterian churches. — *Exchange.*

Ventilating London's Tunnels. — As a result of the recommendations of Sir Benjamin Baker, practical steps have now been taken to ensure the efficient ventilation of the twopenny tube-tunnels in London. A powerful fan has been placed at the base of the left shaft at Bond Street Station, which will remove the vitiated atmosphere from the permanent ways, fresh air taking its place at the various halting-places under ordinary pressure. The fan, which is 48 inches in diameter, and electrically driven, displaces 30,000 cubic feet of air a minute, and is thus capable of entirely exhausting the whole of the tunnels in a fraction over 3 minutes. — *N. Y. Tribune.*

ANCIENT ITALIAN MONUMENTS. — In the course of a recent visit paid by the King of Italy to the Roman Forum, Signor Boni, director of the excavations, pointed out to His Majesty the incongruity of leaving the site of the Roman Senate covered up by a comparatively modern Spanish convent. The view of Signor Boni has commended itself to a number of Italian public men, who have drawn up a motion calling on the Minister of Public Instruction to provide means for the demolition of the convent and the excavation of the site. The motion will be discussed by the Chamber during the examination of the estimates for public instruction. At least a hundred signatures had been affixed to the motion, and it is practically certain that Signor Nasi, Minister of Public Instruction, will make no objection to its adoption. Thus, within the next year, it may be hoped that the remains of the old Roman Senate will be brought to light after having been buried for so many centuries. This is not the only proof of the new interest which the Italian Government and, in particular, the Fine Arts and Antiquities Department of the Ministry of Public Instruction are taking in the preservation of ancient Italian monuments. Efforts are being made, and, as a rule, successfully, to prevent a recurrence of the blind demolition of venerable remains that went on in Italy 20 years ago. The Director-General of Fine Arts and Antiquities constantly sends to the various regional offices of his department the strictest and most precise instructions as to the treatment of archæological remains, and in the majority of cases the local officials show great zeal in executing the orders received. But in Italy the greatest obstacle to any efficacious control and preservation of ancient monuments is the perverse belief that the desire to preserve them is due exclusively to archæological mania. By degrees the advance of education is removing this prejudice and is ensuring a more general respect for the claims of history and civilization, and it is satisfactory to note that nearly every battle undertaken for the preservation of some historical fragment terminates nowadays in the defeat of the vandals. One illustration of this is the action of the Ministry of Public Instruction on behalf of the old walls of Bologna. It was proposed to destroy the ancient structure almost entirely, as a result of the growth of the city. The Ministry has succeeded in obtaining the suspension of the demolition, which had begun at three points, and has made sure that any partial demolition that may be rendered necessary by the growth of traffic and the need for more direct communications shall in no way harm the monumental value of the old walls. At Genoa the Ministry of Public Instruction has averted the danger that threatened the beautiful cloister of Sant' Andrea. The Genoese municipality wished to buy the cloister from the Prisons Administration, to which it belongs, in order to sell the area to private speculators. The Ministry of the Interior, at the request of the Ministry of Public Instruction, has, by its intervention, prevented such a misfortune. Similar intervention at Novara has saved the Sforza Castle from being sold to the municipality and damaged. At Verona a regular campaign has been necessary to prevent the distortion of the famous Piazza delle Erbe, where local vandals wished to erect a large modern theatre. The Piazza Civica at Pistoja is still threatened by the promoters of a monument to Garibaldi, who wish it to be placed alongside the statue to Cardinal Forteguerri. Here, again, the Department of Antiquities is gradually persuading the local enthusiasts for Garibaldi not to spoil the symmetry of the piazza with a modern monument, but to place their statue elsewhere. It seems strange that in a country like Italy, which draws such a considerable part of its prosperity from foreign tourists and visitors, who are attracted to the country by its ancient monuments, there should be so little respect for the records of the past. The only explanation is that ignorant familiarity breeds contempt. The hope of students must be that with the gradual disappearance of ignorance familiarity may yet breed reverence. — *Correspondence of the London Post.*

THE CUENCA CATHEDRAL ACCIDENT. — The Madrid correspondent of the *Times* writes under date April 15th: — "The catastrophe which befell the Cathedral of Cuenca the day before yesterday will not be without some good result if it stirs the authorities to take a little more interest in the reparation of ancient buildings which lie outside the general track of visitors. Cuenca, some 60 miles east of Aranjuez, though an inconsiderable town itself, possesses a fine Gothic cathedral of the sixteenth century, but little known on account of its distance from the most frequented centres of Spain. It would appear, from a question asked in the Senate yesterday by the Count de San Luis, that the dangerous condition of the cathedral tower was recognized so long ago as 1888, when a grant of 100,000 pesetas was solicited from the Government for its repair. The money was not forthcoming, and no adequate measures have since been taken to ensure the safety of the tower. It has now fallen, causing the death of some six or seven people, chiefly children, and threatening the further collapse of a great portion of the cathedral itself. As a matter of fact, the burden of repairs should properly fall upon the municipality, but it is a duty which can hardly be efficiently performed by the *ayuntamientos* of small and impoverished towns, and it would be well if, in their case, the Government could come to their aid."

ELECTRICITY IN BULDING-WRECKING. — Cutting-up tanks electrically is being done in the Auditorium Building, Chicago, by Mr. J. E. Haschke. According to the *Western Electrician*, four elevator-tanks, 12 feet high and 24 feet in circumference, had to be removed, and the noise of the work, if done in the usual manner, would be highly objectionable to the music-teachers and theatre-goers in the building. The electrical cutting is done at the rate of about 1 foot in 2 minutes. The current is supplied at 110 volts by the electric-plant in the building, and is reduced to 30 volts by apparatus of which the design is a secret. One terminal of the circuit is connected to the tank to be cut, and the other to an anthracite carbon 1 inch in diameter, the metal being heated by the arc between it and the carbon. — *Building News.*

GERMAN OLD-AGE PENSIONS. — Emperor William is considering the extension of the old-age pension legislation. Conversing with a recent American visitor about the conditions of labor in the United States, His Majesty said he was determind to make employers contribute to the support of their work-people when the latter were old and invalided. They should not be thrown aside like old shoes after having given all their best years to their employers' interests. Germany already has a fairly comprehensive old-age scheme in operation, but the doles guaranteed are not sufficient to maintain the receivers without private aid. What the Emperor apparently intends is to secure enough to keep the aged people beyond want. Of course they will have to contribute a portion of their wages, throughout their lives, which the State will invest, supplemented by a regular quota from their employers. — *N. Y. Tribune.*

PREHISTORIC VILLAGE IN WISCONSIN. — From discoveries recently made in ploughing up the soil for what is known as the Mitchell Park Addition to Milwaukee, Wis., the place was evidently the site of a large village centuries ago. Grooved stone axes, hammer-stones, arrow and spear heads, and great quantities of flint-chips have been found, and indicate that stone weapons were manufactured on the spot in numbers. Several members of the archæological section of the Wisconsin Natural History Society have visited the place and made a superficial examination, and they have come to the conclusion that there must have been a prehistoric village there, covering 150 or 200 acres. Further investigations will be made, and it is believed that something more definite regarding the inhabitants of the village will be learned. — *N. Y. Evening Post.*

AMERICAN ART-PURCHASES. — The art-critic of the *Vossische Zeitung* complains that American millionaires have sent up the prices of paintings to such a point that European collectors are now unable to compete with them. The fact that pictures go to the United States, says the critic, does not mean their loss to the world, as European artists often assert, and many of the older American collectors often showed genuine appreciation and understanding of art. Quincy Shaw recognized the merit of the Fontainebleau school when its pictures could not be given away in Paris. Mr. Shaw made a larger collection of the paintings of that school than all the French collections put together. The critic of the *Vossische Zeitung* also mentions Henry G. Marquand and Allan Marquand, of New York, and Mrs. Gardner, of Boston, as discriminating picture-collectors. He deplores, however, the invasion of the art-field of the younger generation of American millionaires, whom he declares to be without real artistic appreciation, saying they make it possible for picture-dealers to increase the price of pictures tenfold and thus shut out European buyers.

OLD WOOD-CARVINGS. — Although in the Priory at Christ Church, Hants, at Westminster Abbey, Salisbury Cathedral, and in a few other of our ancient minsters, there may be seen to-day miserere seats and (as at Salisbury) other small portions of stalls dating from the middle of the thirteenth century, the oak in each of which is as sound now as it was in the days when the respective monarchs of the forest bowed their sturdy heads to the woodman's axe, the palm, as regards seniority, is claimed, and justly so, by Exeter Cathedral. Therein, in the choir, may be seen fifty miserere seats, every one different, cleverly carved and enriched by figure and by foliage, the oak in each and every one of them perfectly hard and solid, and altogether innocent of the least indication of rot or decay, carved under the direction of Bishop Bruere (tenth Bishop of Exeter), who ruled over this diocese from the year 1224 to that of 1244. Taken as a whole, they are not only the most perfect examples of early thirteenth-century work in this country, but also in any cathedral or church in the world. Bruere (or William Briwere, as he is sometimes called in ancient manuscripts) was for nearly 5 years away in the Holy Land. This accounts, no doubt, for the altogether Eastern character of some of the figure-carvings upon these superb misereres. One of them represents an elephant, and is of exceptional interest, in that it is the earliest carved representation of that quadruped in existence in England. It is curious, too, in that its carver, apparently never having seen such an animal, has represented it with the hind legs of a dog, although, as we all know now, an elephant's hind legs possess hocks precisely the same as do the fore ones, and hence its ability to kneel down like a Christian. But, after all, we are but a new people; and what with us appears to be ancient history is very modern indeed, when we come to compare ourselves with some other countries — Egypt, for instance. The most ancient carved-wood figure — it is of sycamore — known to exist may be seen in the Museum of Gizeh, at Cairo. It dates from B. C. 3900, so is very nearly 6,000 years old, and still the wood is sound and good. This precious old statuette was found at Sakkarah, and is supposed to represent one of the overseers of the workmen engaged in building the pyramids which abound in that immediate neighborhood, and, by comparatively recent discoveries, have been proved to be the oldest of all the pyramids of Egypt. The statue is known as the "Sheikh-el-Beled," or "Sheikh of the Village," a name given it by the Arabs who found it, because its features represented very closely those of the man who was then their own sheikh. In this we get a wonderful instance of how human nature, through the roll of thousands of years, keeps on repeating itself. The statue is distinctly a portrait, showing a jolly, well-fed, closely shaven man of fifty summers or thereabout, altogether nude, save for a cloth bound by a leather girdle about his lusty loins, and reaching down to his knees. He stands erect, and in the right hand grasps a staff, but I do not think the latter is part of the original. The exact height of the statuette is 3 feet 8½ inches. A careful cast in plaster-of-Paris of this wonderful old carving was made early in 1894, and may now be seen in one of the Egyptian Galleries of the British Museum. This, then, is the oldest known existing example of the wood-carver's craft. — *The London Woodworker.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, JULY 5, 1902 No. 1384

CONTENTS.

SUMMARY: —
Coming Competitions for Government Buildings. — Works of American Artists residing abroad entitled to Free Entry. — Sanitary Science at the Massachusetts Institute of Technology. — A Fraudulent Strike against the American Woollen Company. — The Judiciary and the Labor Unions. — The Coal Strike. — Unconstitutionality of a New York Labor Law. — Appointment of an Architect to the New York Department of Bridges. — Free Tuition in the National Academy of Design's Schools. — Irrigation and the Reclamation of Land. — Removal of the Hygeia Hotel at Fortress Monroe. — A French Architect murdered for condemning a Contractor's Work. 1
ITALIAN BELL-TOWERS. 3
LETTER FROM CHICAGO. 6
ILLUSTRATIONS: —
The Tower of St. Mark, Venice, Italy; — The Campanile: La Badia, Florence, Italy. — Sta. Maria in Cosmedin, Rome, Italy; — Campanile of the Cathedral, Pistoja, Italy. — Woodland-Avenue Front of the University of Pennsylvania Dormitories, Philadelphia, Pa. — The Promenade: University of Pennsylvania Dormitories.
House at Oxford, Eng.
Additional: University of Pennsylvania Dormitories: Main Entrance, Philadelphia, Pa. — The Promenade Terrace: University of Pennsylvania Dormitories, Philadelphia, Pa — "The Torrazzo," Cremona, Italy. — S. Apollinare in Classe, Ravenna, Italy: Two Views. — La Ghirlandina, Modena, Italy; — Campanile of S. Gottardo, Milan, Italy. — Cathedral, Monte S. Giuliano, Italy; — S. Satiro, Milan, Italy. . 7
COMMUNICATION: —
Incombustible Lifting-sash Window-frames. 7
NOTES AND CLIPPINGS. 8

THE provision made by Congress for new public buildings covers four which will probably, under the Tarsney Act, be opened to limited competition among selected architects. These four are situated at Washington, Providence, San Francisco and Los Angeles. There is to be a new Post-office in the city of New York, but nothing has been done except to authorize the selection of a site, and proposals for this purpose have already been invited.

THE Treasury Department has made some important rulings explanatory of the clause in the Dingley tariff permitting the importation, free of duty, of works of art by American artists residing temporarily abroad. There has always been a question what constituted temporary residence, and the Treasury now decides that the duration of temporary residence shall not be limited by any fixed period, provided the artist has not renounced, or intended to renounce, his American citizenship, but declares, in the manner prescribed by the Treasury regulations, his intention, at some later period, to return to this country. The children born abroad of citizens of the United States, who have not renounced their American citizenship, are also citizens of the United States, and entitled to the privileges accorded by the Dingley Act. On the contrary, a wife takes the citizenship of her husband, and an American woman artist who marries a foreigner thereby expatriates herself, and cannot claim the privileges of the Dingley tariff. In order to establish the identity of works of art imported under this clause of the Dingley Act, they must be accompanied by the declaration of the artist, or of actual witnesses of their production, or by other evidence satisfactory to the Collector at the port of importation; but it is not necessary that they should have been purchased directly from the artist, transfer of ownership not affecting the privileges conferred by the Act.

THE Massachusetts Institute of Technology has received a gift of five thousand dollars, with the promise of five thousand a year more for two years, for the purpose of conducting investigations in sanitary science, including the questions of the purification of water, and the disposal and utilization of sewage, garbage and other wastes. The work will be carried on under the direction of Professor W. T. Sedgwick, the present head of the Department of Biology of the Institute.

IT is interesting to observe how rapidly the judiciary is taking in this country the place which it has occupied for so many centuries in England, as the guardian of liberty, in England against the encroachments of royal prerogative, and in this country against attempts at organized oppression. A few days ago the Supreme Court of Wisconsin, which has already distinguished itself for its clear judgment in such matters, handed down a decision, declaring a State law prohibiting an employer from discharging a man because he belongs to a labor union to be unconstitutional and void. As the Court well says, if the employer's liberty to say whom he will hire, and under what conditions he will employ him, can be curtailed by legislation, the liberty of the laborer can also be curtailed, and he may be compelled to work against his will for persons, or under conditions, unsatisfactory to him. To put the matter in another way, if it is lawful for politicians or labor unions, through legislation, or in any other manner, to compel employers to submit to dictation in the employment of labor, then it would be equally lawful for the employers, if they should get a chance, to compel laborers, against their will, to submit to such terms as they might choose to impose; that is, to enslave them. Many of the States, through the political influence of the labor unions, have statutes by which the members of the latter, a small minority, it should always be remembered, of the actual working population, are given undue and tyrannical advantages over the rest of their fellow-citizens. Through these unjust laws the community in general suffers continual distress and loss, and such a decision as that of the Wisconsin Court, which, by its clear and convincing logic, is likely to influence judicial action all over the country, constitutes an important step in the development of American liberty.

ONE of the principal reasons why judicial decisions upon the right of labor unions to control other people's business are needed is the growing damage inflicted upon employers and employed alike by the personal squabbles of unscrupulous labor leaders, and the means which they use in pursuance of their private ends. Not long ago, there was a very serious and prolonged strike in the mills of the American Woollen Company. The Company operates many factories, in different States, and, while grievances may have existed in one or two mills, the operatives in the others were contented. This state of affairs, while it makes a settlement of differences, by arbitration or otherwise, very easy, does not suit the agitators, who know well that a quarrel without any tangible ground is generally the most difficult to settle, as well as the most vindictive; and they endeavor to enlist as many people as possible, by "sympathy" or otherwise, in a dispute in which they have no personal concern. In the case of the American Woollen Company, they were hindered in their efforts to bring about a general strike in all the mills of the Company by the circumstances that most of the operatives had no reason for striking, and no wish to do so. To meet this objection, it occurred to some of them to send to each mill, to be read before the members of the union in that mill, a letter from the Secretary of the Rhode Island Union, making statements and appeals calculated to arouse the sympathies of the members. This device was quite successful, and it was not until after more strikes had been declared, and misery brought into hundreds of households, that some one asked the Secretary of the Rhode Island Union about the letter, and discovered that he never wrote or signed any such document; that he entertained no such sentiments or ideas as those expressed in it, and that the whole affair was an impudent forgery from beginning to end.

OF course the American Woollen Company suffers to a considerable extent by strikes brought on by such means, but their loss is insignificant in comparison with that of the poor weavers thus heartlessly deceived into sacrificing their living. To those connected with building affairs, who have many occasions for seeing how essential to the comfort of myriads of humble, but happy, homes is continuous employment for the working members, and how quickly the interruption of employment shows itself in the pale faces, the patched clothes and worn-out shoes of innocent children, who do their best to bear bravely their undeserved misfortune, there is something exasperating in the knowledge that these miseries are often brought about for the sole purpose of gaining political influence, or attracting bribes, for the men whose authority ought to be used in befriending the poor, and that, worse than this, the men who so infamously betray those whose interests

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

they pretend to protect do, in point of fact, very often secure the offices or the bribes which they seek by such means. In default of means for bringing politicians to a sense of their duty in such matters, the courts form the best resource; and if there is no way in which men who are deceived into abandoning their employment through forged letters can obtain pecuniary indemnity, it is certainly possible for them to proceed under the criminal law, and they may be sure that judges and juries will help them to make such transactions hazardous.

AS an illustration of the burden which class-legislation in favor of the members of labor unions imposes on the whole community, the present strike in the anthracite coal region may well be studied. Wherever in this country a kitchen stove, or a furnace, or steam-boiler, depends for fuel on anthracite coal a heavy tax has for some weeks past been exacted, and will continue to be collected for some weeks more, to pay a part of the cost of an unnecessary contest, brought on by an attempt at the sort of coercion of the employers which the Wisconsin Court has declared to be unlawful, and maintained against the will of the great majority of the miners themselves, by the same sort of unlawful coercion of the men who wish to go back to work. Besides the sum which the community is obliged to contribute in the shape of an increase in the cost of coal, toward this unlawful demonstration, it pays, in addition, a heavy indirect tax, through the impoverishment of the miners, who are said to have lost in wages, since the strike began, not far from fifty million dollars, and are so much the less able to buy for themselves and their families the comforts and necessaries, the manufacture of which would have given employment to a vast number of their fellow-citizens.

CONSIDERING that only about fifteen per cent of skilled mechanics, according to the statistics, really belong to labor unions, the friends of liberty and equality will not be sorry to hear that Corporation Consul Rives, in New York, has given his opinion that city authorities cannot legally provide in contracts that only members of unions shall be employed on the work contemplated by the contract, for the reason that such a stipulation establishes an illegal and unconstitutional discrimination between different classes of citizens, at the same time that, by excluding from city contracts all but certain privileged persons, it prevents competition among contractors.

MR. HENRY F. HORNBOSTEL, of New York, well known in the profession as an accomplished and well-trained architect, has been appointed consulting architect to the New York Department of Bridges. The Commissioner of Bridges, Mr. Lindenthal, has long favored the development of the artistic side of bridge-designing, and Mr. Hornbostel is well qualified to aid in such matters.

THE National Academy of Design, in New York, has taken the radical step of abolishing all tuition-fees for instruction in its classes in drawing and painting. Considering the number of schools of the kind, of a very high grade, already existing in New York, which are dependent upon a small tuition-fee for support, as, for example, those of the Art Students' League, the action of the Academy looks a little like unfair competition; but the standard of admission to the Academy has always been high, and if, as the managers of the schools hope, the abolition of fees should enable them to raise it still higher, the effect upon artistic education ought to be favorable. At the School of Fine-Arts, in Paris, tuition, as every one knows, is free, yet the School stands, probably, higher than any other in the world; and if the National Academy can take graduates from the League schools, the Cooper Institute, the Pratt Institute, Columbia University, and the other excellent schools of fine art, and develop them, in a few years, into rivals of the great French artists, it will be a most important factor in the development of American art. To rival the Paris School, however, the Academy should have something like the resources of the French institution. It must not only have an additional endowment to pay the expenses hitherto met from tuition-fees, but should be able to offer the brilliant prizes which the French School holds out to faithful workers in all departments. It should have a Prize of Rome, or something equivalent to it, carrying, as the Prize of Rome does, Government favor and assured employment for life, and should be able to offer also special prizes in various departments, so that those whose talents lead them in particular directions may have the hope of winning, in the work most congenial to them, a lifelong reputation, as well as considerable sums of money.

THE HONORABLE FRANCIS G. NEWLANDS, Member of Congress from Nevada, who is well known for his intelligent study of many matters of public interest, delivered a speech a few weeks ago before the House of Representatives on the Reclamation of the Public Lands, which is well worthy of study. Mr. Newlands is not at all given to bombastic declamation, and his clear and dispassionate statements carry conviction with them. In fact, so reasonable are his views that we think he would find the opposition of the Eastern farmers to the pending irrigation bill, which, at best, is, we imagine, less serious than he seems to suppose, materially lessened by the extensive dissemination of the report of his speech. As every one knows, the plan now under consideration in Congress contemplates the adoption, on the part of the Government, of comprehensive measures for storing, at the most advantageous places, the flood waters of the rivers rising in the Rocky Mountains and elsewhere, so that they can be released for use for irrigation when needed in the dry weather of summer. It is obvious that the Government of the United States, which alone has jurisdiction over the course of a river flowing, like most of the Western streams, through several States, and can condemn and take lands in any State, is the only agency by which great works of the kind in this country can be efficiently and economically carried out, at the same time that, as owner of six hundred million acres of arid, or semi-arid, land, it has the largest interest in the results of the undertaking. The plan in contemplation, as described by Mr. Newlands, is for the Government to build dams and construct main canals, in such manner as to collect all the water possible, leaving the settlers to build branch canals at their own expense, in such a way as may best suit their agricultural operations. The bill provides that the work, which must of necessity go on slowly, shall be paid for out of the proceeds of the sale of arid public lands, so that no money will be taken from the Treasury for it; and it is provided that the cost of the reservoirs and canals shall be apportioned over the territory served by them, and added to the price of the land; so that, as sales of the reclaimed land are made, the cost of reclamation will be repaid. Nothing could be more sensible and rational than such a scheme, and there seems to be no reason why it should not be carried out successfully. It is true that the speculative schemes for irrigation works which have been carried out in various parts of the Southwest have almost always ended in a loss to the stockholders, but, even if honestly and economically managed, they have been conducted at a disadvantage, through the limitation of their powers of taking land, and, as a matter of fact, it is notorious that they have, in many cases, been utilized for swindling in the grossest manner the Eastern capitalists who furnished the money for them.

THE great Hygeia Hotel, at Fortress Monroe, where many of our readers have probably found health and happiness, is to be removed, to clear the ground for military purposes. As every one knows, the hotel stands on the Government reservation, as do also many other establishments of the same kind, public and private. For many years they have occupied the ground on sufferance, but the War Department has decided that it is necessary for military purposes to have the whole area cleared, and has given orders for the removal of all buildings within a reasonable time.

M. AGERON, a French architect of distinction, died a few weeks ago under circumstances which have a melancholy interest for the profession. Although still a young man, he had acquired a high reputation for professional skill, and had been repeatedly called in as expert in important cases. A group of school-buildings, in process of erection in the city in which he lived, had shown signs of imperfect construction, and he was called upon by the municipal authorities to undertake the supervision of the work. He found certain materials defective, and, as in duty bound, reported his discovery to the municipal officials. For this reason, apparently, no other being given, the contractor waylaid him at the railway-station, where he knew that he would find him, and shot him dead. What has been done to the murderer we are not informed, but criminals of this kind do not often escape, in France, the punishment that they deserve.

ITALIAN BELL-TOWERS.

"CAMPANILE," in Italian, has the same signification as "bell-tower," in English, "*clocher*," in French, and "*Glockenthurm*," in German, and the oldest bell-towers of Italy hardly date back beyond the fifth century. This is proved by the mosaic on the triumphal arch of Santa Maria Maggiore at Rome, a work of the time of Sixtus III (430–40), where towers rear themselves alongside a baptistery and basilica; and even on the celebrated wooden doors of S. Sabina at Rome there exists something which seems to be a tower (these doors are of the fifth century, of the time, as it appears, of Celestin I, or about 422–32). But we are not at all certain that these towers had bells in them, so one ought to call them simply towers, or *torri*. It is certain, all the same, that bells were in use in Italy in the eighth century, during the pontificate of Stephen VII (752), who in giving bells to the Vatican Basilica must have introduced their use into the Eternal City in the middle of the eighth century. This statement of Amalario's, Bishop of Treviri, a contemporary of Charlemagne, cannot be accepted without some reservation. However that may be, at present, the most ancient bell in Italy, that of the Museo Falconi at Viterbo, has been acknowledged to belong to the eighth or ninth century, and it is, in truth, an article of venerable antiquity. It is very simple, this bell of the Museo Falconi, as it has no artistic pretence whatever unless in the general mass, which has a certain elegance of line and the peculiarity that there is a triangular hole and an engraved design which De Rossi, prince of Christian archæologists, believes to be the roof of a three-nave basilica. Add a cross to the curved extremities characteristic of the seventh and eighth centuries, and you will have an image of the general appearance of the Falconi bell as it was exhibited for the last time at the feast of the Eucharist, at Orvieto, in 1896.

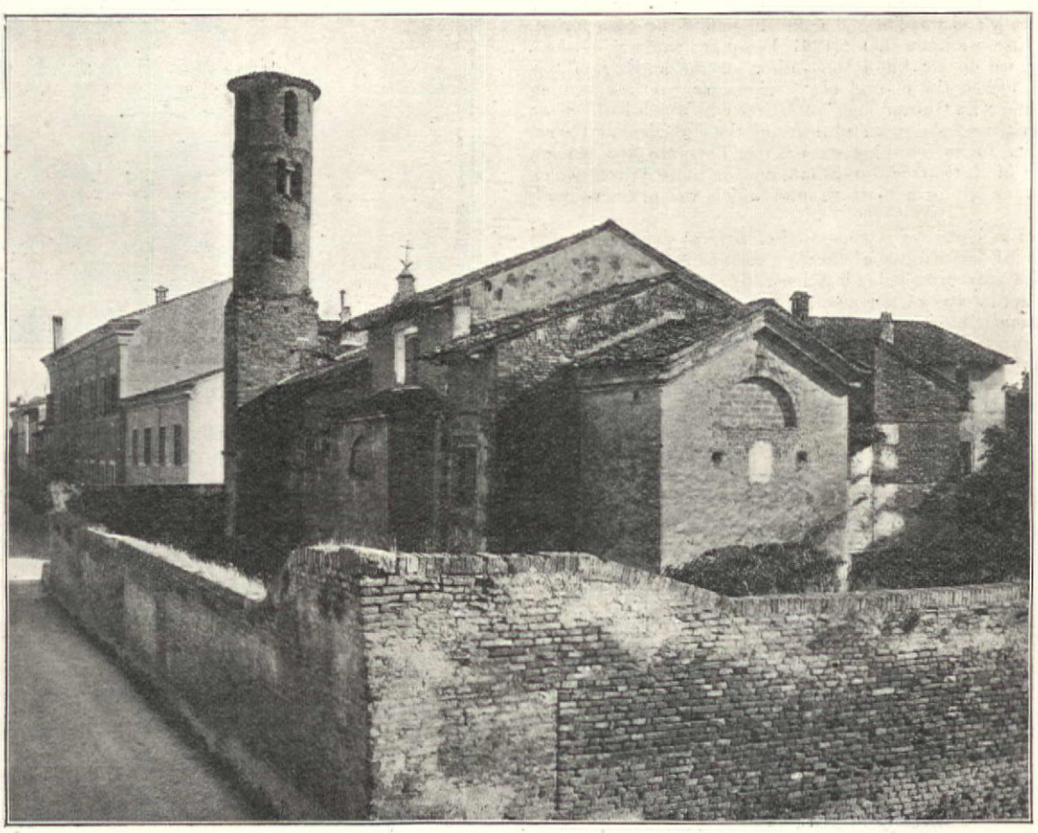
Well, though I ought only to speak here of bell-towers, allow me to say that De Rossi compares the Falconi bell to a certain representation in the codex at the Library of Bologna, whose assignment to the ninth century has not yet been seriously disputed.

Now let us come to the monuments.

In Italy there are very few churches with bell-towers on the flanks of the façade or rising near the apses. In Sicily there are the cathedrals at Cefalu and at Monreale. In Apulia — a monumental corner of the Peninsula very little known — are the cathedrals at Altamura, Molfetta and Bari; in Æmilia, the cathedral at Borgo S. Donino; in Lombardy, the churches of S. Ambrogio and S. Sepolcro at Milan, as well as S. Abbondio at Como; in Piedmont there is S. Andrea at Vercelli; in Liguria, the Cathedral of Genoa, one of whose towers is still unfinished. In other countries, on the contrary, limiting myself to old Europe, church façades with two towers are numberless, and are found in France, Germany, England, among those in the Romanesque and Gothic styles.

In the same way, in Italy, there are very few churches with more than two towers, as we see in the case of the cathedral at Palermo and at Borgo S. Donino, and fewer still are those with a single tower in the middle of the façade, as in the case of the churches of S. Maria del Tiglio, at Gravedona (Lake of Como) and S. Matteo in Campo d'Orto, at Perugia. So, with us, almost all churches have single bell-towers, and some that are isolated, but erected quite near to the church building. In this last category may be mentioned the cathedrals at Pisa and Florence, the Church of S. Zeno at Verona and St. Mark's at Venice.

The oldest bell-towers on the Peninsula are surely the Byzantine ones at Ravenna, round like that of S. Apollinare in Classe, which is the most beautiful of the Byzantine towers of that city, which might be called an Italo-Byzantine Pompeii. The tower of S. Apollinare in Classe dates to the same epoch as that of S. Apollinare Nuovo at Ravenna, generally given as the eighth century, but in my opinion it is still older. A beautiful round tower of the same kind is that of SS. Giovanni and Paolo, also at Ravenna, lately brought out into sight by means of reasonable restorations. In short, the Byzantine towers of Ravenna by reason of their form or by their construction are remarkable specimens of the most ancient bell-towers in Italy. This emphasizes the fact that with us the most ancient bell-towers were often round. A tower of this same form that is very little known, even to Italians, is to be found at Caorle, in Venetia, and it is to be regretted that I could not obtain for you any photograph of it. But I can give a reproduction of the bell-tower of S. Satiro at Milan, justly considered the oldest of the square bell-towers, the square form having remained characteristic of almost all of the Italian bell-towers. This is a structure of the ninth century, of serious character and simple motive, one of those monuments which are always preserved with the greatest care. Milan and Lombardy possess several of the finest Italian bell-towers, among others the tower called "dei Monaci" of the basilica of S. Ambrogio, which, from the historical point-of-view, has many rights to be mentioned here. But for artistic towers we must leave the centuries earlier than the year 1000, and turn to the eleventh, twelfth and thirteenth centuries. It must be remarked, however, that some amongst these towers which date back beyond the year 1000 one would like to call older yet. This, also, might be said of several of the mediæval churches in Italy. For example, I will mention S. Maria in Cosmedin at Rome. This tower, of a perfect elegance and exquisite air, is indeed attributed to the eighth century, but, for me, it belongs to the twelfth. By the side of this



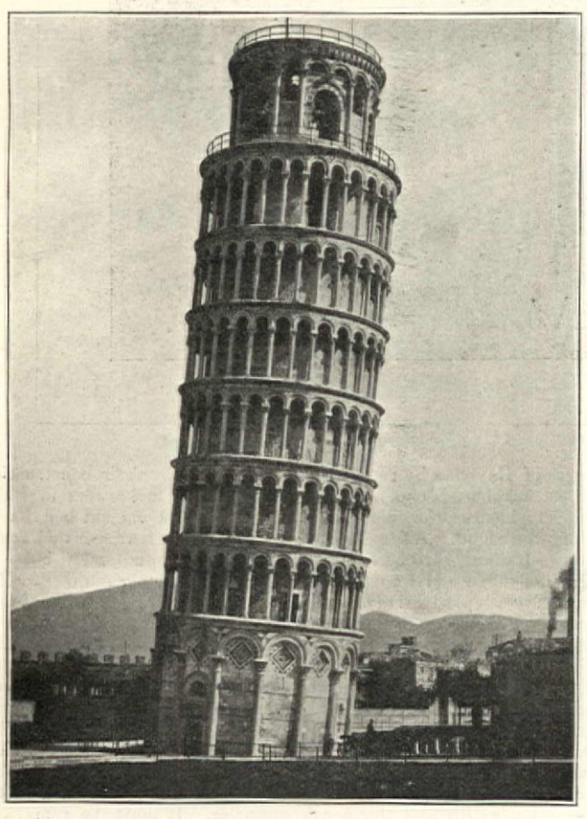
SS. Giovanni e Paolo, Ravenna, Italy.

celebrated tower we will find in Rome that of S. Maria in Trastevere, which dates from the time of Innocent II (1130–43), and also that of S. Maria Maggiore, the origin of which does not go back farther than the twelfth century. It is evident that this tower has been restored, and history tells us that these restorations took place in the times of Gregory XI (1370–78) and Paul V (1605–21). Bell-towers are typical of the Eternal City, and one must bear this in mind. Rome possesses other remarkable towers — those of SS. Giovanni e Paolo, a work of the twelfth century, and S. Croce in Gerusalemme, built at the end of the same century, a century which inspired the architect of the tower of S. Spirito in Sassia who, like the modern eclectic architect, introduced forms belonging to the full Renaissance. This brings it about that this architect dressed up a mediæval organism in details belonging to the fifteenth century.

The centuries following the year 1000 have brought us to the more celebrated towers of Lombardy, Æmilia and Tuscany. Here we are before the "Torrazzo" at Cremona, admirable in its elegance and in its fineness of ornament, a *chef d'œuvre* of great renown, which surpasses, and by much, that of the city in which the tower rears itself, where it is esteemed like a jewel in its casket. This is entirely a brick structure, a material greatly used in Lombardy and Æmilia. The history which relates to the Torrazzo most often is based on ancient traditions which have nothing of serious value belonging to them. The real truth is this: the tower of Cremona cannot date back to the eighth century, and the old writers deceived themselves, since historic reasons, as well as those of art and construction, demonstrate that the Torrazzo was begun in the twelfth or thirteenth century and was finished about the end of the same period, as it appears, since we know that in 1267 the square part was finished. Unfortunately, we do not know the author, or the authors, of this Torrazzo, considered the marvel of Cremona, as are the leaning tower of Pisa and "La Ghirlandina" of Modena, of which I will speak after having criticised the graceful tower of the cathedral at Crema which resembles, in its crowning stories, the Torrazzo at Cremona and the tower of S. Gottardo at Milan, one of those jewels which the Middle Ages left as a heritage and which we preserve with pride.

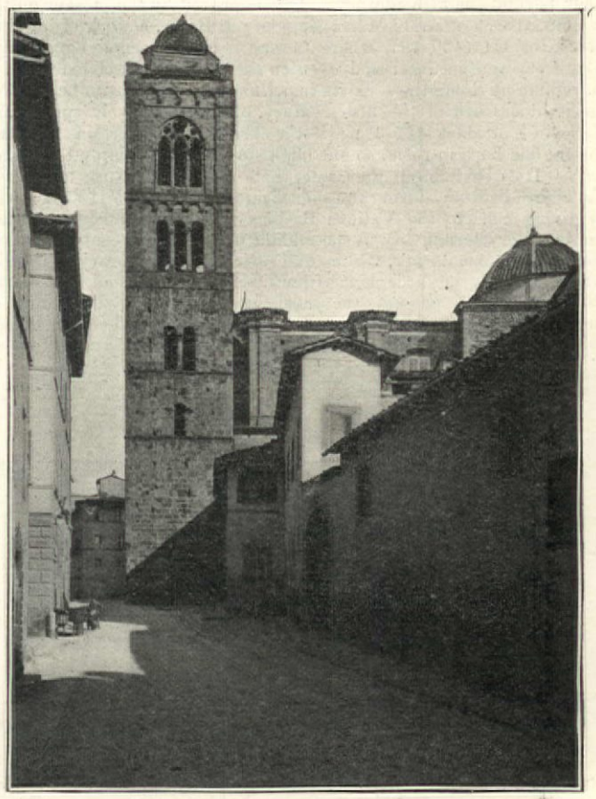
The tower of S. Gottardo is composed of several stories, crowned by a conical roof carried on a circular colonnade, and the brick and the discreet polychromy give it a decorative aspect which is very striking. Its author was a Cremonese, "*Magister Franciscus de Pecoraris de Cremona fecit hoc opus,*" and its date the first half of the fourteenth century, which speaks to us of an age extremely happy for Italian fabrication.

In accordance with Italian Chauvinism "La Ghirlandina," that is to say, the tower of the Cathedral of Modena, is the peer of the Torrazzo, but the tower at Modena is very far from possessing the



The Campanile, Pisa.

beauty of the Torrazzo. The Modenese, however, do not esteem their tower any less than the Cremonese esteem the tower of their cathedral, for in certain Italian towns there exists a true communal pride in their own monuments, and very often the most remarkable monuments are used as symbols of the city. The lower or square portion of the Ghirlandina was built, it appears, at the same time with the cathedral, and finished in 1159. Above this portion of the structure rise the octagonal and pyramidal portions which were built



Campanile of the Cathedral, Pescia.

between 1261 and 1319, according to the plans of Arrigo da Campione. Lately, the restorations carried out on the tower at Modena have cost the city a large sum.

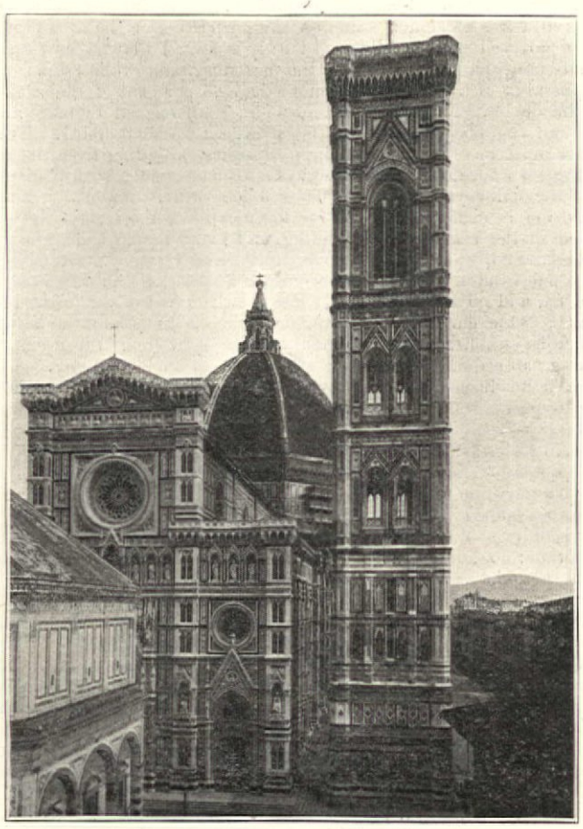
Near Modena, at Bologna, in Æmilia, the towers "degli Asinelli" and the "Garisendi" enjoy the highest reputation. The first belongs to 1109, the second to 1110. These are two leaning towers, but civil and not ecclesiastic, as are the others which are the subjects of this article. They can, nevertheless, be brought to mind here, before speaking of the celebrated leaning tower of Pisa, the tower of the most famous and superb cathedral in the Romanesque style in all Tuscany.

Everybody knows the "Campanile of Pisa," better known for its inclination, perhaps, than because of its open loggia treatment, too much repeated. It was finished in 1174 by the architect Bonanno, and, most often, like the towers of Bologna, it is admitted that its inclination is accidental. Upon this subject we can remark that when the inclination was discovered in the lower vaults the architect endeavored to apply a remedy, and history tells us that during a certain length of time the work was stopped and it was then that the architect was changed. Bonanno was replaced by Guglielmo of Innsbrück, who did not, however, continue the work to the end, as the tower was finished by Tommaso da Pisa, to whom reverts the honor of having placed upon the summit of the tower a bell-chamber.

Its departure from the vertical is very noticeable, being 2.40 metres, and the question whether the inclination was accidental or intentional has been frequently discussed. The last author who has resolutely willed to hold himself apart from the generally accepted opinion is your Professor Goodyear, who, in his remarkable studies on the refinements of Italian architecture of the Middle Ages — studies only just current in Italy — has not hesitated to profess his belief that the displacement of the tower of Pisa is one of those effects of art, one of those *bizarreries* in which the architecture of the Middle Ages abounds. Professor Goodyear points out that even on the façade of the Cathedral of Pisa there exists a certain displacement from the vertical and then a return to the vertical, and this North American writer, who has a love for such subtilties, as Pennethorne and Penrose had for those of Greek architecture, brings together such a quantity of facts drawn from our architecture of the Middle Ages that one must listen to him with the most respectful deference; this I shall do here, and I shall do so elsewhere, in the fourth edition of my "*Manuale d'Architettura Italiana,*" which I hope will be brought out in the first months of the coming year.

Quite near Pisa are Lucca, Pescià and Pistoja, whose respective cathedrals have important towers. The tower at Pescià, unfinished and dating from the middle of the fourteenth century, is very little known. Its robust and simple construction, which does not deprive

it of grace, urges me to exhibit it here, but I am far from according it the importance which the pretty tower at Pistoja deserves. This tower, which rises square in plan to the very top, recalls the open loggia treatment of the campanile at Pisa, although at Pistoja the use of these loggias, common to the Romanesque architecture of



The Campanile, Florence.

Tuscany, is more modest. The decoration of the tower, in white and dark-green marble, gives it an air of lightness while preserving to it its imprint of majesty. The author of the tower of Pistoja is not known as are the authors of the campanile at Pisa, but his style indicates the epoch, the end of the thirteenth century or the beginning of the one following.

The railroad leads from Pistoja to Florence in forty minutes. Florence possesses the most celebrated tower in all Italy, a glorious monument which at once calls up Giotto's name. But is this evocation a legitimate one? This is what we are going to find out after having noted at Florence the tower of S. Maria Novella and that of the Badia (1330), two towers which, while very models, are far from having the beauty and the richness of Giotto's tower.

The tradition of ages gives to Giotto the honor of being the architect of the campanile which rises at the side of the Cathedral of Florence and, although this tradition may be devoid of all authenticity, in Italy, at least, one cannot separate the campanile at Florence from the name of the reviver of Italian painting.

It is very sure that Giotto laid the foundations of the tower in 1334, but, dying in 1336, he was replaced by Andrea da Pisa, who ought to be called Da Pontedera; but this master, whose place in the history of art is that of a sculptor and in no way that of an architect, was dismissed, because he desired to introduce certain changes in the tower. It was then that the Florentines entrusted the direction of the work to Francesco Talenti, the real architect of the campanile of Florence; that is to say, the architect of the upper stories, the most beautiful and glorious portions of the construction.

Amongst the Italian artists of the Middle Ages in the architectural field, Talenti was in very truth one of the most distinguished and the most forgotten, and that one of the writers upon art who shall produce a study of this Florentine artist will exhibit to the public and students of art a new architect of real genius where there was believed to be one merely of the second rank. Talenti accepted the direction of the work on the Florentine tower at the time when that work was hardly begun, and having finished it his name should take the place of that occupied by Giotto. It is not probable that Talenti followed the drawing of the immortal painter, which might be identified with that which is found on a parchment in the Cathedral of Siena, a design which is strikingly grotesque in taste.

I regret that a general study such as this is does not allow me to stop longer on these particular matters. I beg the reader, therefore, to believe that my affirmation is supported by facts.

I turn now to Southern Italy, and in Apulia we find the tower of Trani, a monument of particular importance because it is signed by an artist who has some points of resemblance with Talenti, as being long forgotten. This is "*Nicolaus sacerdos et protomagister*," who built a great portion of the tower, finished in the second half of the fourteenth century. In Apulia, also, admirers of towers will find at Bitonto the campanile of S. Leo, a work of the thirteenth century, simple, logical, robust and elegant. I do not refer to the towers of the Cathedral at Bitonto, renewed in the fifteenth century, the origin of which dates back to the first quarter of the thirteenth century.

I turn now to Sicily, whose mediæval architecture has a peculiarly Arabo-Byzantine-Norman-Sicilian, eclectic air; in a word, pervaded by an eclecticism which passes all prevision, and produces in the history of architecture a page full of attractiveness and charm. Of this you will gain an idea from the illustration of the towers of Monte S. Giuliano and of Girgenti in the first place.

Everywhere here the pointed arch appears in full twelfth-century work, and we see in this pretty fragment of the tower of the Cathedral of Girgenti ogee arches, arches, that is, formed by two curves having different directions, and we can remark in this same fragment the zigzag decoration in the archivolt of the topmost window. Here it is necessary to remark that it is not a matter of an isolated motive, but of a motive which is very widely scattered in Sicilian architecture, the Norman origin of which cannot be put too much in evidence. This kind of ornament was preserved in Sicily up to the end of the fourteenth century, and I believe that the fragment we have before us belongs precisely to that epoch.

The most important Sicilian bell-tower, however, is that of the church called the Martorana, at Palermo. The construction of the tower is intimately connected with that of the church, and the church, which, as well as the Palermitan bridge over the Oreto, was built in 1143 by Giorgio d'Antiochia, a celebrated dignitary of the Norman court, was richly endowed in 1146, and before taking on the name of Martorana was called S. Maria dell' Ammiraglio, a name which has been preserved to this day. In time, to the old church was annexed a monastery, founded by Aloise Martorana, which brought about the change of name, and in the sixteenth and seventeenth centuries changed greatly its physiognomy.

Amongst the portions preserved is the tower, which presents a picturesque *ensemble* of a kind quite new for the Italians of the Continent. It is the upper stories which most generally are appreciated, and travellers ought to examine the details and, above all, the pretty capitals.

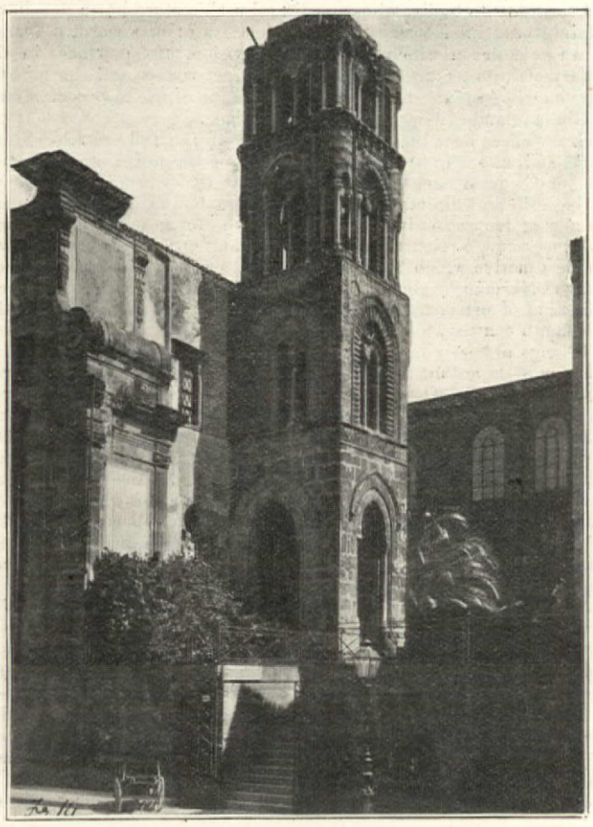
At Palermo, when visiting the Cathedral, one is impressed by the towers which surround it; — at the beginning of this paper, I pointed out that the Cathedral of Palermo was one of those rare Italian monuments decorated with several towers.

At length, taking our way northward, after the Gothic tower of

Lower Part of Tower of the Cathedral, Girgenti.

the Cathedral of Albenga, near Genoa, one of the most beautiful in Liguria, after the tower of S. Agnese in Genoa, dating from 1260, and, on the north side of the Peninsula, after the tower of the Abbey of Pomposa, a monument which even in Italy has remained too much unknown, I take my leave of the subject by drawing attention to the

Tower of S. Mark at Venice. A leaning tower, this one, too, but not sensibly, as in the case of the towers of Bologna and Pisa, but which possesses the strange peculiarity of having no stairs. Instead of staircases, there are inclined planes, on which you can ascend to the top of the Venetian tower afoot, on horseback or on bicycle, if you will. It is enough to cast one's eyes over the monument to perceive that it belongs to two epochs profoundly different, and that the

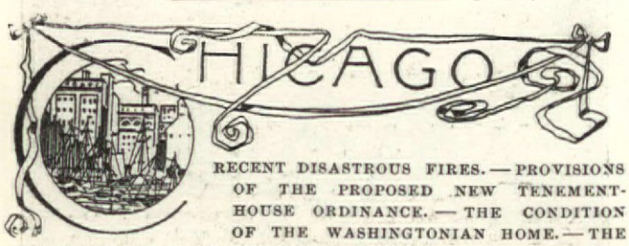


The Campanile: Church of the Martorana, Palermo.

tower of S. Mark's, begun before 948, was begun anew in that year, according to some, or in 1068, according to others, or in 1147, according to still others, and in the course of the centuries underwent several periods of construction before its completion. The records speak of works dating back to 1310, to 1489, to 1511; in fact, in 1489, a thunderbolt struck the tower, and Giorgio Spavento designed the restorations, and in 1511 a thunderstorm again damaged the structure. It was then that the Tower of S. Mark received the upper stories, according to the plans of Bartolomeo Bon, of Bergamo.

To point out one more interesting detail: it was pretended that the foundations of the tower were as deep as the tower is high, and likewise that these foundations were star-shaped in plan. Although these assertions are found in books and are widely disseminated, I draw attention to the fact that during the excavations carried on in 1865 it was learned that the foundations of the Tower of S. Mark are not over 5 metres deep, and there is nothing remarkable in such a depth as this.

ALFREDO MELANI.



RECENT DISASTROUS FIRES. — PROVISIONS OF THE PROPOSED NEW TENEMENT-HOUSE ORDINANCE. — THE CONDITION OF THE WASHINGTONIAN HOME. — THE INCREASED COST OF BUILDING. — THE MARSHALL FIELD AND THE "TRIBUNE" BUILDINGS.

WITHIN the last six months, the number of disastrous fires in Chicago, with attendant loss of life, has been most appalling. Tenement and flat buildings have gone down like houses of card, giving their occupants scanty chance of escape; many of them, with their would-be rescuers the firemen, have been either injured or killed. It grew to seem the usual, rather than the unexpected, to be greeted with such horrors when the morning paper made its appearance.

About a week ago a very disastrous fire occurred on the South Side, in what had been once an old hotel, but which was known as St. Luke's Sanatorium, a resort for those addicted to the excessive use of drugs and liquors. Here the violent patients, who were locked in their rooms, were simply roasted alive, the building going so quickly that no help could be given the poor unfortunates. All these serious accidents have led, first, to the reconsideration of the building-ordinance, and, secondly, to an investigation of existing hospitals and similar institutions, with a view to formulating building-laws for the better protection of their inmates.

The new tenement-building ordinance, which is now being considered, takes a decided stand on the proportion of the area of a lot to be covered by a building. In it, it is stated that no new apartment-house shall occupy, above the first story, more than 80 per cent of the area of a corner lot or more than 65 per cent of the area of an inside lot. No new tenement-house shall exceed by more than one-half the platted width of the street on which it abuts. Every house must have at least one flight of stairs extending from the roof to the entrance-floor. All stairways must be provided with banisters, and the hallways must be at least 3 feet wide. Naturally, ample provision is made in the bill for fire-escapes. Yards must be provided in the rear of each building, and every inside court must be unobstructed, save by the fire-escape. Every room must have at least one window opening directly upon a street, an alley, a yard, or a court, and no room shall offer less than 400 feet of air to the individual. One curious item in the ordinance is the standard of light which is established. Every hall must be light enough to permit of reading an ordinary newspaper at noon on an unclouded day.

"All inside courts must have 10 feet of space between windows and opposite walls, while all outside courts must have 5 feet of space.

"All stairways must be enclosed within brick walls for the sake of fire-protection.

"All partition-walls between apartments must be of brick or some fireproof material.

"Buildings of four or five stories must be of slow-burning construction; buildings more than five stories must be of fireproof construction.

"A notice must be posted in the public hall of each apartment-building by the Building Department, stating that the building has been constructed in accordance with the laws of the city."

These are some of the chief points in the ordinance known as the Mavor Ordinance, from the name of Alderman Mavor, who has fathered it, and, in consultation with Fire-Chief Musham, has worked it into shape. Such philanthropists and sociologists as Jane Addams and Prof. Graham Taylor are deeply interested in the matter, and are anxious to see the ordinance passed by the Council. They feel that the area limitation is one of the most important features. The opposition to this comes from the speculative builder, who builds neither for the present good of the tenants nor the future good of the city. Should the ordinance be passed by the Council, it is further hoped that the laws will be held in force. Several items in the ordinance, like the provision for brick walls between apartments, are not new, but they have been practically a dead letter for some time.

Since the disastrous St. Luke's Sanatorium fire an investigation is being set on foot by the Board of Health and Building Department, which will include inspection of all hospital buildings throughout the city. So far only the Washingtonian Home, a hospital for inebriates on the West Side, has been investigated, with a result that was not entirely satisfactory. It was found that patients that were violent were confined on the third floor in windowless rooms, the walls of which are lined with wood. In this part of the building, where the doors are of heavy wire and securely locked, there are no fire-escapes. In the main part of the building there are no elevators, and the fire-escapes were found to be unsatisfactory. Certainly the practice of locking helpless patients in high stories, when there is no adequate system of fire escape, is to be condemned, and should be controlled by law.

Building-interests are moderately active here, though nothing like a building-boom is in sight, nor will there be one so long as the price of building is kept up to where it is. On any house built anywhere at a cost of from $4,000 to $25,000, the advance of the cost of building at present over that of 1899 is over 37 per cent.

The increase is due not only to the stand taken by the trades in their different unions, but also to the tremendous increase in the price of material, the result of trusts and combinations in manufactures and supplies. True, much more luxury and elegance is demanded in the average home of to-day than in the one built, say, five years ago even, but this is only a side issue in the subject of the increased cost of building. Certain it is that all classes interested in building transactions are overreaching themselves, for there is nothing more sure to put a stop to activity along these lines than the extortionately high price of materials, as it stands at present. Labor is higher than formerly and naturally helps materially to increase the cost of building, but, as said before, the largest increase comes with the higher price of materials. The same paper quoted above further gives a list of the actual increase of profits now expected and demanded, against that demanded in '99.

"Foundation and excavating contractors' annual profit sought now, 33 per cent; in 1899, 15 per cent.

"Plumbing-combine profit sought now, 150 per cent; in 1899, 50 per cent.

"Electrical manufacturing and supply combine, annual profit sought now, 135 per cent; in 1899, 45 per cent.

"Brick combine, annual profit sought now, 75 per cent; in 1899, 30 per cent.

"Glass combine, annual profit sought now, 100 per cent; in 1899, 50 per cent.

"Lathing, plastering, interior finish, annual profit sought now, 40 per cent; in 1899, 20 per cent.

"Heating-apparatus combine allied with plumbers, figures about the same.

"Hardware, annual profits sought now, 60 per cent; annual profits in 1899, 35 per cent.

"Mosaic and tiling work, annual profit sought now, 30 per cent; in 1899, 12 per cent.

"Labor's return is estimated to have increased from 3 to 10 per cent since 1899, making labor still the cheapest part of the expenses of house-building."

Two prominent buildings mentioned in these letters before as being in the process of construction are now practically completed and thrown open to the public. These are the Marshall Field retail building and the Chicago *Tribune* Building. If one were to hunt the world over for a building which was nearly devoid of all architectural pretensions, one which ignores every chance of a line of grace or refinement of touch or design, no better example could be found than this same Marshall Field Building. The material is granite, the lines hard and uncompromising for the first seven or eight stories, then some carving crops out in the last story or two, of a nature too weak to "carry" from the height at which it has to be viewed. The very grouping of the windows is staring and uncompromising. Two narrow divided windows stand either side of a broad plate-glass sheet, unbroken even by the usual middle sash-line. This combination, regularly set, continues through six or seven or eight stories, beginning just above the first two, one of which contains the usual show-windows of the retail dry-goods store. The entrance of the structure is a portico of Classic pretensions. Huge monolithic granite drums rest on flat, characterless bases, raised on solid granite blocks. The Doric caps would lead one to expect a fitting Doric base, and the lack of proper moulding comes as rather a shock: when so little is attempted one would naturally expect to have that little of a refined and satisfactory nature. The interior of the building is quite in keeping with the exterior; absolutely no attempt at decoration in any form or kind is visible. The building is light and airy, and at present as white as whitewash and plaster and plate-glass can make it from end to end. That is all, and in spite of the gay trappings of a great dry-goods emporium, the place is cheerless and bare.

The *Tribune* Building is quite the opposite in character to the Marshall Field one. Its material is buff Bedford-stone and brick. Bronze is the material used for the lower window-sashes and linings of vestibule, giving a warmer tone to the general color of the lower stories. One curious and successful feature is the changing of the usual large first-story windows in the office-department into small ones of ordinary size, raised 4 or 5 feet above the sidewalk. The effect is very good and doubtless has also a utilitarian purpose, as the higher windows must be more suitable for a place where large crowds at times assemble, as they do around a newspaper office. The grouping of the other windows is unaffected and dignified, and much more pleasing than in the building just mentioned. The ornamentation of the first story chiefly centres around the entrance, but is strong in design and good in execution. It, as well as that reserved for the upper stories is of Classic feeling, that placed in the higher parts being sufficiently strong to carry well, and means something from the sidewalk-level. The building at present is twelve stories high, but it is said that eventually four more stories will be added to it, which will in no ways add to the attractiveness of the façade, it is to be feared.

The entrance is an interesting feature of the building. Columns with monolithic shafts flank either side, while the chief interest in the ornamentation centres around the eagle and wreath, of classic proportions, above the door. Bronze electroliers, of very charming design, flank either side. The vestibule is lined with bronze plates, bearing bas-reliefs of the past homes of the *Tribune*, beginning as far back as 1847, with an old two-story wooden structure, where the newspaper's quarters were in the second story, above the drug-store, which was on the first floor.

The entrance-hall is not large, but is very attractive. Entirely lined with white marble of good quality, the inlaying of green and pearl mosaics in the ceiling makes a charming color-scheme. Marble stairs, with marble balustrades, lead up on either side to the second story, while the walls above the first-story level are relieved by columns, mouldings and arcades. This is naturally a great improvement on the usual square slabs of marble, with which entrance-halls are often lined, and gives a much more architectural effect. The slabs of marble used in the arcaded portions are especially beautiful, being large and unusually free of flaws. The bronzework, of which there is a great deal around the building in window-sashes, door-frames, office fixtures, electroliers and elevator-cages, cars and fittings, is charming, both as to design and execution. The Winslow Brothers' castings are as certain to be a delightful feature in a building as Tiffany glass or mosaics.

The entire building, both in general character and detail, is one of the most successful of the large office-buildings erected in Chicago for some time.

A rather unusual structure, and also a very striking one, is the Bush Temple of Music, on the North Side. Its material is a light buffish brick combined with white terra-cotta. It is in the early French Renaissance style. Its general lines are excellent, the whole effect being striking and picturesque, with its high pointed roof broken into two side gables, the central portion surmounted by a clock-tower. The details are disappointing, and the pleasing impression made by the general appearance of the building is not confirmed by them.

Our friend the local reporter on architecture, to whom reference has been made before, especially distinguished himself in his description of this building. He says the building "is designed after the Hôtel de Ville, Paris, and built of brick, tile and steel. Only three buildings in the city are of this particular style of Gothic architecture: the Newberry Library, the Chicago Historical Society, and the *Record-Herald* Building." How could he have picked out any three buildings more lacking in resemblance to it than these? The libraries are both Romanesque, the Newberry of an especially dignified and simple type, while the *Record-Herald* Building is in no special well-recognized style, but is a happy adaptation of past forms to nineteenth-century needs, which the late John Root knew so well how to handle.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE TOWER OF ST. MARK, VENICE, ITALY; — THE CAMPANILE: LA BADIA, FLORENCE, ITALY.

STA. MARIA IN COSMEDIN, ROME, ITALY; — CAMPANILE OF THE CATHEDRAL, PISTOJA, ITALY.

FOR description of this and the preceding plate, see article "Italian Bell-towers" elsewhere in this issue.

WOODLAND-AVENUE FRONT OF THE UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

THE PROMENADE: UNIVERSITY OF PENNSYLVANIA DORMITORIES.

[The following named illustration may be found by reference to our advertising pages.]

HOUSE AT OXFORD, ENG. MR. HENRY T. HARE, ARCHITECT.

THIS plate is copied from *Building News*.

[Additional illustrations in the International Edition.]

UNIVERSITY OF PENNSYLVANIA DORMITORIES: MAIN ENTRANCE, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

THE PROMENADE TERRACE: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA.

"THE TORRAZZO," CREMONA, ITALY.

FOR description of this and following plates see article on "Italian Bell-towers" elsewhere in this issue.

S. APOLLINARE IN CLASSE, RAVENNA, ITALY: TWO VIEWS.

LA GHIRLANDINA, MODENA, ITALY; — THE CAMPANILE OF S. GOTTARDO, MILAN, ITALY.

THE CATHEDRAL, MONTE S. GIULIANO, ITALY; — S. SATIRO, MILAN, ITALY.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

INCOMBUSTIBLE LIFTING-SASH WINDOW-FRAMES.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — After reading the admirable and sagacious papers lately published by Mr. A. J. Bloor, on those fairy-tale phrases, "fireproofing" and "fireproof buildings," I wrote the following: —

"Any one who has seen a fire begin in a building knows with what incredible rapidity the flames mount the vertical trim, or architraves of doors and windows. In 1875, in a banking building in Wall Street, New York, I substituted cast-iron trim. But this is clumsy and expensive. In 1895, for the Colt Memorial Building at Hartford, Conn., I found that by crimping folds in sheet-copper, I could imitate the pockets for the weights and sash of the lifting-sash window. Instead of wooden sash, the ordinary leaden sash of glass-stainers can be substituted, and metal chains for the combustible cords. I felt that whoever would widely introduce such incombustible windows would be entitled to the gold medal of the Royal Humane Society. The advantages of lifting-sash windows, for purposes of prompt ventilation, are well known. Any worker in sheet-copper who has a crimping-machine can readily construct such a window for exhibition purposes, and, on exhibiting it, would probably receive a profitable supply of orders for such windows.

"So much for windows; now for doors. The secret of absence of fires in Florence is mainly that the locks are on the outside of the doors, instead of being mortised into their thickness, as in America. Hence, the jambs of the doorways do not need any rebates for the doors to shut against, and no wood is needed. The rebates are on the doors themselves, and shut against edges of thin marble slabs, sawn out and stood up against the brickwork of the jambs of the doorways. The American habit of always demanding what one is used to prevents the appreciation and the use of these and other far-seeing contrivances, which make fires in Florence of rare occurrence, and, when they do occur, they do not spread, or cause much damage."

X. Y. Z.

NOTES AND CLIPPINGS

The Ruins at Copan. — Among the ruined Central American cities of ancient culture, Palenque, Quirigua, the Usumatsintla towns, Tikal and Copan, the last-named attracts the greatest interest at present on account of the resumption of archæological explorations there. Its ruins are situated on the banks of Copan River, Southern Honduras. The site where the main temple stood is now a square platform with steep declivities on all sides. The temple is gone, leaving no trace behind except the western approach. When the Peabody Museum of Archæology, at Cambridge, sent its first expedition to the spot in 1891, the whole structure was overgrown with heavy timber. The elevation where the temple was is now known as Mound 26; at present it looks like a high pointed pyramid, the apex and sides of which have been considerably reduced by the disintegration constantly going on. The western side of this pyramid presents the greatest architectural feature that has yet come to light in Copan, namely, the "Hieroglyphic Stairway." The steps of this stairway were formed by large stone blocks carved on the front side with the well-known calculiform figures, some of which are intended for numerals, and others for names, generic terms, and the like. The first who directed attention to the stairway and the excellent design and workmanship of its component parts was Maudsley, and his genius also pointed out the former importance of the spot, of whose earlier shape heavy landslides had made recognition well-nigh impossible. From the latest measurements it appears that the whole width of the stairway, including the balustrades of 3½ feet, was 26 feet; that of the altar at the bottom, 12 feet. As regards height of slope, the portions of the stairway still *in situ* measure 25 feet, which is just one-fifth of the whole slope once covered by the stairway. The probability is that there were 80 carved steps from the base to the top of the stairway where the temple stood. The several human figures which decorated the centre of the stairway show the sculptural art to have been crude, though full of promise, and the whole structure must once have left on the spectator a weird and awful impression. Of the inscription which formerly decorated the stairway, but a few broken fragments remain. The story is told by George Byron Gordon, with admirable photographic illustrations, in No. 6 of Volume I, of the *Memoirs of the Peabody Museum.* — *N. Y. Evening Post.*

Clerkenwell's Historic Gateway. — St. John's Gate, Clerkenwell, London, was erected after the insurrection of Wat Tyler, at the end of the fourteenth century, for that gentleman's levies took the trouble of burning down the old gate, which had stood for two centuries before their time. It had been built when St. John's Priory was erected there by the Knights Hospitallers, after the crusade of the first Richard. The gate is built of brick and freestone; its walls are quite 3 feet thick, and its towers were formerly much higher than they now are. These towers are in four stories, and over the gateway itself will be noticed a room which is the most famous of all rooms over bars in this country. For in this upper room Cave set up his press in 1731, and from it issued the first number of the *Gentleman's Magazine*. Here came Richard Savage in search of work at the hand of Cave, and there he subsequently spent much time in writing; here labored for the magazine a greater than either Cave or Savage — one Samuel Johnson, whose fame was later to become immortal. Here the great David Garrick made his *début* in London. Into this room came a jovial Irishman named Oliver Goldsmith in search of Johnson, and here the two friends often passed many hours in converse. Here flourished later the Urban Club, a literary coterie of reputation in its day. But many years before these men of letters had given a special interest to the place there had been royal business transacted in this very chamber; it was here that Richard III came to tell the Council how cruelly and bitterly his foes lied about his treatment of Lady Anne Neville, his wife. Close by the gate lodged the Princess Mary, when her brother, Edward VI, was on the throne, and here he often visited her. Elizabeth had her court revels rehearsed in the gateway chamber before they were performed at her palaces, and the brave old gate bore no small part in the Sacheverell riots of other days. The room at the base of the west tower was in 1813 a house for the watch; it was then made into a dispensary for the hospital; then it became a coal-shed; and later it blossomed out into a bookshop. To-day it is the headquarters of that noble institution, the St. Ann's Ambulance Association. — *Windsor Magazine.*

Lumber and Timber Products. — In the Census report on the "Utilization of Wastes and By-products," Mr. H. T. Kittredge says: "Nearly all of the formerly waste products of lumber and timber are now turned to some utility, and some of the new products thus formed are of considerable value. Of this latter class may be mentioned sawdust, which was formerly considered an absolute waste material, and was allowed to float down the stream or was thrown into a heap where it could be most conveniently disposed of. French cabinetmakers have found a way of preparing this material which gives it a value far above that of solid timber by a process that has been in vogue for at least twenty-five or thirty years, combining the use of the hydraulic press and the application of intense heat. By this process the particles of sawdust are formed into a solid mass capable of being moulded into any shape and of receiving a brilliant polish, and possessing a durability and a beauty of appearance not found in ebony, rosewood, or mahogany. This product is known as '*bois durci*.' Artificial woodwork, therefore, seems to have a promising future. Alum, glue and sawdust, kneaded with boiling water into a dough, and pressed into moulds when dried, is hard and capable of taking on a fine polish. Ornaments of great beauty can be made from it very closely resembling carved woodwork. The production of acetic-acid, wood-naphtha, and tar from sawdust is one of the latest enterprises in Norway. A factory has been started at Fredrikstad capable of distilling 10,000 tons of sawdust in a year. It also manufactures charcoal briquettes, which are exported to the Netherlands. The acids are chiefly placed on the German market, while the tar is mostly consumed at home. The factory is said to be the first of its kind erected in that country. According to an English patent of 1897, sawdust may be so prepared as to be non-inflammable, and then applied to jacketing of boilers and other purposes."

Investigating the Lightning-conductor. — Time uses its broom effectively when it is given sufficient latitude. It has long been accepted as a truth that lightning-conductors are an efficient protection for high buildings, tall chimney-stacks, etc. This belief now appears to have been called in question. There are few people to whom the truth of this matter will be of greater importance than the textile manufacturers of the country. Their buildings, except weaving-sheds, are nearly all lofty, while to every separate establishment there is a tall chimney-stack. Nearly all are fitted with lightning-conductors, yet they are not infrequently damaged by the electric-fluid. These facts, being in apparent conflict with accepted views, have led to a number of scientific men forming themselves into a lightning-research committee, which has for the past eight or ten months been giving its attention to the subject. Until the Committee began its work it was generally assumed that a conductor protected a considerable area around it, or attracted the bolt if near, and conducted it harmlessly to the earth. The information which the Committee has so far collected does not bear this out, as the lightning has sometimes been found to strike and commit damage within a few feet of the conductor. The conclusion the Committee has drawn from present information is that a single conductor affords practically no protection, and may even be a source of danger. If the thorough protection of a building is possible, it is alleged, it can only be effected by a network of protectors spread over or around the building, and with many earth connections. The network would distribute the electricity, which would find its way to the earth through the various rods. Above all, the researches of the Committee have completely exploded the theory of the value of a single rod on a church-tower or lofty chimney. It is highly desirable that the truth should be ascertained and incontestably established. — *Manchester (Eng.) Textile Mercury.*

Whistler as a West Pointer. — "West Point in 1854" is the subject of an interesting article by Loomis L. Langdon, in the *Army and Navy Journal*. Speaking of James McNeil Whistler, the writer says: "There was a curious story told of the way he didn't pass his examination after remaining at the Academy three years. The subject given him in chemistry to discuss before the Academic Board was 'Silica,' which constitutes 8 per cent of the solid matter of our earth. Whistler, it is said, in perfect innocence of the subject, but with his characteristically charming manner, discribed silica as an 'elastic gas' or 'a saponifiable fat.' The young ladies in the audience smiled approval, but the stern Academic Board dispensed with Whistler's further valuable services at the Military Academy. He found employment for a time in the United States Coast Survey at Washington, but, finding that his compensation 'hardly paid for his gloves,' he went to London, and years afterward made a reputation as a painter."

Proposed Colossal Statue of Australia. — There is talk of erecting at the entrance to Sydney Harbor, as a monumental tribute to the triumph of federation, a colossal statue of "Australia Facing the Dawn," a sort of rival to "Liberty Enlightening the World," from the island in New York Bay. Funds, however, have not been forthcoming, and now it is reported that one of the principal advocates of the project has written to Lord Rosebery suggesting that a contribution from the £3,000,000 left by Cecil Rhodes to "promote the consolidation of the English-speaking people" might be legitimately allocated to this purpose. — *Boston Transcript.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, JULY 12, 1902 No. 1385

CONTENTS.

SUMMARY: —
The New Department of the Fine-Arts at Columbia University. — Professor Sturgis on the proper Functions of Universities in the Matter of Art Instruction. — The Noise of the Boston Elevated Railway. — The Historical Associations with the New York Hall of Records. — A Return to the Use of Cast-iron in Building advocated. — The Parsons Plan for relieving Congestion at the Brooklyn Bridge. — The Modern German Cartel System. 9
THE ROMAN GALLEYS OF LAKE NEMI. 11
TECHNICAL AND SCIENTIFIC BOOKS. 13
A NEW YORK STUDIO. 14
MODERN METHODS OF SEWAGE-TREATMENT. 14
THE NEW TARIFF-RULINGS ON AMERICAN ART. 15
ILLUSTRATIONS: —
Plans and Elevation: United States Post-office and Court-house, San Francisco, Cal. — Details of Interior Finish of one of the Court-rooms of the Same. — Grotesques; — Arcade to Promenade: University of Pennsylvania Dormitories, Philadelphia, Pa. — Entry Doors: University of Pennsylvania Dormitories, Philadelphia, Pa.
"Moonhill," Cuckfield, Sussex, Eng.
Additional: Small Tower on Woodland Ave.: U. P. Dormitories, Philadelphia, Pa. — U. P. Dormitories from the Botanical Garden. — Interior Finish in the Library of the United States Post-office and Court-house, San Francisco, Cal. — Studio of A. A. Anderson, Esq., Bryant Park Studios, New York, N. Y. — Present Condition of the United States Post-office and Court-house, San Francisco, Cal. 15
COMMUNICATION: —
"Collapse of the Steel-concrete Elevator at Duluth.". . . . 16
NOTES AND CLIPPINGS. 16

THE proposed consolidation of the Departments of Architecture and Music in Columbia University with the courses in history and practice of fine-art connected with them, into what may be called a rudimentary school of fine-arts, has given occasion for a discussion which cannot fail to be of value, whichever side those interested in it may take. For the present, the plans of the Trustees of the University contemplate nothing further than a more complete correlation of the courses which they already offer. Except in architecture and music, they do not profess to offer a complete training in any art, and their view, that while all men of education may derive benefit from some knowledge, practical, as well as theoretical, of the arts of painting and sculpture, those who are in preparation for the careers of architecture and music will find great advantage in a concentration, if we may use the expression, of the artistic atmosphere in which their years of study are passed, is abundantly justified by experience. Notwithstanding the conservatism of the plan described by the Trustees in their official announcement, it seems to be assumed by the public that the University will later undertake to turn out graduate painters and sculptors as well as architects and musicians; and the artistic community has taken for its theme of conversation this assumption rather than the actual scheme proposed.

AMONG the comments which have appeared in the newspapers on the subject, the greatest weight should perhaps be attached to a letter from Professor Russell Sturgis, addressed to the President of the University, and published in various newspapers. Although we cannot entirely agree with Professor Sturgis in some of his ideas of artistic education, most of his letter is of great importance and value; and while it does not seem to us to be quite relevant to the actual scheme proposed by Columbia University, it is, as an essay on the general subject, which is one of the most pressing now before the community, well worthy of extended circulation. As an accomplished and learned artist, and an experienced teacher, Professor Sturgis finds it necessary to call attention in the most emphatic manner to the necessity of technical training, above everything else, in the education of those who are to practise painting and sculpture. These, he reminds us, are manual arts. Undoubtedly, they are the greatest of the manual arts, but this does not alter the fact that skill of hand and eye is absolutely essential to both of them, and that without this manual skill no intellectual power, and no mental training, can ever produce good works of sculpture or painting. As, in his judgment, the manual skill requisite for the practice of these arts can only be acquired by many years of constant endeavor, he thinks that for persons destined for an artistic career, it is necessary, instead of sending them to college, to hurry them through such instruction in "their native tongue, arithmetic and other simple studies" as they can acquire before the age of fifteen, and then set them at the manual practice of their chosen art under a good master, "all day long and every day," "until the master finds that his apprentice has grown up to his own stature." After this, Professor Sturgis says, "If the university should wish to teach this artist in his later life, when the young man, already a master in his art, feels the need of more literary cultivation than he has had hitherto, then, to his mature mind, and his faculties of perception and acquisition trained, though not in the literary way, the university may offer literature, language, science,— what you will." "It would be a noble thing," Professor Sturgis continues, "to have such a course of collegiate studies for the grown man. On the other hand, nothing but injury to the artist's career can come from anything like a serious attempt to teach him any of those things which are contained in the language of words during the years which he should devote exclusively to his artistic training."

IT would not be easy to state a position in clearer terms than these, and the community has reason to be grateful to Professor Sturgis for giving to the discussion a perfectly definite form at the outset. We need not say that no university would pretend to take boys of eighteen, and in four years turn them out accomplished artists, so that the question is not whether college training or a long apprenticeship is the best preparation for an artistic career, but whether one excludes the other, so that the man who has spent, let us say, six years in his university course, and in the preparation for it, is thereby cut off from the hope of ever acquiring the manual skill necessary for the successful practice of the graphic arts. In answering this question, while we have Professor Sturgis's own weighty opinion on one side, supported by that of Mr. Ruskin, who declares that to color well "requires your life,— it cannot be done cheaper"; it seems to us that there is a great deal of evidence in favor of the opposite view. It is always difficult to say what a man might have accomplished if his training had been something else than what it was, but every one will recall the names of many successful artists trained in the universities, and trained, too, at a time when university training did not include the slightest trace of the artistic cultivation which Columbia University proposes to afford its students during the four eager and susceptible years of their college life. Not even Professor Sturgis can deprecate more earnestly than we do the old American fashion of talking about the arts, instead of practising them; but this fashion is rapidly passing away, and the American artist of the present day understands as well as any one that he must make his impression upon the world with his brush or chisel, and not with his mouth. With this conviction, aided by the wholesome competition which now exists, not only between American artists among themselves, but between them and the French and English and German artists whose works are hung beside theirs at the great international exhibitions, the painters and sculptors who will, in the next generation, represent this country are not likely, as it seems to us, to be injured by college training, but the reverse. It is very possible that the loss of continuous manual practice during a part of four or six years may show itself in the work of a college-trained artist; but it seems to us that this loss will be more than made up by the greater power of mental concentration, the deeper sympathy, and the simplicity of taste and dislike of affectation, which are cultivated, if not developed, by university life. No one has more frequent occasion than the artist to observe how greatly the hand is influenced by the mind. A strong impression of beauty of form, or color, or expression will betray itself even in the work of an unskilled artist, as multitudes of specimens of archaic painting and sculpture show us; while mere handling has never brought more than temporary fame to an artist of cold heart, or of dull and irresolute mind. There is still a tendency in the arts, a survival, possibly, from the artificiality of the seventeenth and eighteenth centuries, to exalt technique at the expense of sentiment. Professor Sturgis himself shows something of this tendency, perhaps, when he says, of an art more familiar to our readers, that "architecture as practised in modern times is not a manual art, but is a combination of an intellectual but non-artistic study with science, and with artistic traditions now embodied in books"; and we hope that

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

some, at least, of our readers will agree with us that this tendency, now happily going out of fashion before the tide of life and aspiration and conscious power which is advancing over the American people, should be resisted by all who desire to help in the development of the fine-arts which will surely follow. There is no place where true sentiment finds a more congenial home, and where conventionality and affectation are more uncomfortable, than in a university; and we hope and believe that in this way, if in no other, our great colleges will be able to take an important part in the movement which lies so near the hearts of all American artists.

AN interesting question has come up in connection with the Boston elevated railway, in a suit by an owner of a house on Harrison Avenue for damages sustained from the construction and operation of the road in front of the building. The claimant asks for compensation, not only for the darkening of his windows, the dust raised by the trains and the annoyance caused by the moving lights at night, but for the noise caused by the traffic. On the other hand, although there is no doubt that the Boston elevated railway is a very noisy affair, the corporation holds that its charter, interpreted in connection with the general statutes of Massachusetts in regard to railways, protects it from claims for damages on this score. The question is exclusively one of law, but the decision will be awaited with interest by owners of real-estate on the line of the road, as well as by the public. In fact, the interest of the public is, perhaps, greater than that of abutting owners, for juries, where, as in the present case, a man's rents have fallen off six hundred dollars a year since the building of the road, would be likely to award him suitable compensation on general principles, without inquiring how much of the loss was due to noise, and how much to dust and darkness; while the public, which has no claim to damages, suffers much more from the noise than it does from the dust and the moving lights of the trains. In many ways the engineering of the Boston rapid-transit lines is worthy of highest commendation, and for the benefit of the community, if not of the railway corporation, it seems as if something might be done to mitigate the deafening racket which attends their operation.

CERTAIN excavations made in the basement of the old New York Hall of Records have brought to light some interesting historical evidences. The building was erected in 1756 as a debtors' prison, but twenty years later, when the city was occupied by British troops, it was appropriated for military purposes, and was used for the confinement of prisoners of war. It was placed particularly in charge of the Provost Marshal, Cunningham, and was called the Provost Prison, to distinguish it from the sugar-houses and other buildings, and the hulks in the harbor, which were utilized for similar purposes. The horrors of the prison-ships have been often described, but Cunningham seems to have done his best to make his Provost Prison as uncomfortable a place of residence for captured "rebels" as the rotten hulks anchored in the harbor. Among other devices which he employed for disciplining his prisoners, among whom was for a time the brave Ethan Allen, was a "slow gallows," provided with a noose which tightened very slowly around the neck of the sufferer, so as to prolong his agonies. The room in which this instrument was placed is still intact, as are also several other underground cells, in one of which can still be seen the cavity made in the brick wall by some Revolutionary prisoners, who attempted to escape in this way, but were discovered, and all executed by the "slow gallows." Their bodies are said to have been buried under the cellar floor, and the workmen employed in the present repairs have actually dug up bones, apparently human, which have been, of course, carefully preserved by the authorities. On the completion of the new Hall of Records, the old building is to be used as a Revolutionary Museum, for which it is well adapted.

THE perennial discussion of the best methods of metallic construction has been given a new turn by the appearance of a letter in the *Scientific American*, from Mr. George L. Morse, a well-known expert, earnestly advocating a return to the old-fashioned cast-iron columns in buildings, in place of steel. He says, of course with reason, that cast-iron columns are not only cheaper, but are less liable to corrosion, and much less readily affected by heat; and he surmises that the greater familiarity of engineers with steel, as used in bridge and girder work, may have led them into a preference for the material about which they know most which is not quite justified. He observes that with high, narrow buildings, in which wind-bracing is necessary, steel verticals must be employed, as wind-bracing cannot easily be applied to cast iron; but under ordinary circumstances, he thinks it very desirable to use cast-iron columns in exterior work wherever possible.

AS this is a view of the matter which comes up every few years, and is, of course, eagerly adopted by contractors, who understand perfectly the difference in price between steel and cast-iron, it may be well, from the practical standpoint of the architect, to observe that the periodical removal and abandonment of the use of cast-iron for verticals has been due much less to the ignorance of engineers and architects of the properties of this material than to the conviction born of their experience, that it is, in most lofty buildings, unsuited to the conditions. Mr. Morse says that cast-iron columns cannot be used where wind-bracing is necessary; but bracing is practically needed in every building over six stories high, not merely to protect it against the effect of wind, but to prevent the racking which may occur from a great variety of causes, as well as to give security against those variations of the frame from true vertical lines which, a few years ago, used to occur so frequently, and which are so detrimental to the strength and endurance of the construction. Again, while good cast-iron is an excellent material for many purposes, bad cast-iron is a very poor material, and it is much more difficult to detect flaws in cast-iron columns than in steel ones, while a defect in a cast-iron vertical, perhaps with twenty stories resting on it, similar to the defects which have brought down hundreds of cast-iron columns under a comparatively trifling load, might have terrible consequences.

MR. WILLIAM BARCLAY PARSONS, the Chief Engineer of the Rapid Transit Commission of New York, proposes an interesting plan for the relief of the congestion of travel over the Brooklyn Bridge. The plan, which is approved by Mr. Lindenthal, the Commissioner of Bridges, is, in brief, to change the grades of the railway-tracks on the bridge and its approaches, so that the cars, instead of starting from the street-level at Park Row, will be underground at that point, continuing thence by tunnels northward and southward, the northern tunnel extending to the new Williamsburgh bridge and returning to Long Island over it, and the southern tunnel extending to Maiden Lane, and thence, under the East River, back to Brooklyn; the tracks thus forming two loops, one to the northward, and the other to the southward, tangent only in the portion crossing the bridge; so that both the trains and the trolley-cars cross the bridge only in one direction, the trolley-cars returning to Brooklyn through the Maiden Lane circuit, while the trains return by the Williamsburgh bridge. Mr. Parsons's plan contemplates a station on Park Row, adjacent to the Rapid Transit station, so that passengers from the upper end of Manhattan Island may step directly into the Brooklyn cars; and he also proposes to erect on the site of the present Manhattan bridge terminal, facing west over the Park, an important municipal building, with archways under it, through which foot-passengers and ordinary vehicles can reach the bridge.

SOME of our Western grain-growers might take a hint from the German farmers, who have formed an extensive association to protect themselves against oppression from corporations. As every one knows, the sugar-beet is one of the principal products of German farms, and from the sugar-beet is made alcohol, as well as sugar. A combination has long existed between the great sugar-refiners, which has enabled them, not only to control the market for refined sugar, but that for raw sugar and beets, inasmuch as the farmers, having practically no customers outside the combination, are obliged to sell to the latter at its own price, or to have their beets left on their hands. In the matter of alcohol, which is made from the inferior beets and raw-sugar wastes, the farmers have been wise enough to join in the formation of a "cartel," similar to that existing among the owners of the German coal-mines, by which prices and output are regulated for the common benefit, at the same time that the members are protected against the dictation of monopolies. The plan has proved so successful that it is not unlikely that similar "cartels" may be formed to regulate the sale and production of other agricultural products; and our wheat-raisers, who are said occasionally to suffer from combinations of millers and exporters, might do well to watch the proceedings of their foreign brethren.

THE ROMAN GALLEYS OF LAKE NEMI.

WHEN, from the top of one of the surrounding hills, one's glance sounds the clear waters of Lake Nemi, one perceives a mass of confused forms, with rounded contours and indistinct lines, and divines that they are drowned objects sleeping there from the times of the grandeur of Rome in the crystal liquid of the "Speculum Dianæ." They are lying there patiently in their dress of sea-weed and mosses until the indolent posterity of the conquerors of the world pluck them from their repose to ask them to throw light on that departed civilization which has left them there.

In fact, this volcanic shell with its luxuriant vegetation, this placid and sombre lake, sleeping in the midst of the thick and encircling forests, this amphitheatre of hills, these almost perpendicular gradins covered with bushy trees through which, here and there, penetrate imposing cliff-fronts burned by the sun, this oval lake of Nemi, is, in a word, one of the corners of Latium where there is still vigorous the memory of the glorious age of Rome; and it is a veritable amphitheatre whence, at times, there appears to ascend a mysterious influence. Ilex and chestnut crowd together on the banks, like spectators motionless on the gradins through waiting centuries; in a corner below the village, the orchards flower in the springtime with the thousand rose-tinted stars of peach-trees, the white constellations of the apple-trees, and these gay tints cut across the melancholy green of the trees as in the Roman circuses the podium of the vestals must have stood out athwart the pressing and vulgar crowd of spectators. Here is a flagged path over which, in former times, the litters of the Roman matrons used to pass in going to consult the Oracle of Diana, for this lake, these forests and these mute cliffs, the thick shadows and lively colors of this countryside were only the crown of the temple of the goddess of the woods and chase; it is here that the dynasty of autocrats, who formed the veritable expression of the limitless power and frightful wealth of the Roman Empire, at the same time that they condensed in themselves all the faults and vices which brought about its decadence, used to come to enjoy a spectacle of which nature had borne all the cost. Sumptuous villas once lined the shores of the lake and rose stage over stage above the surrounding slopes; treasures of art came hither demanding a framework from this incomparable landscape; the very water cradled palaces and floating temples.

When the pitiless decadence, the barbarous fatality broke the last energies of the Latin world, everything here fell into ruin, was destroyed and rotted away, forgotten, buried under the fertile soil or beneath the placid waves. It only needs to remove this earth, to sound with one's eyes these sleeping waters, to discover the remains of an epoch, its *spolia opima*, its rich objects and its imperishable souvenirs.

Museums have been enriched with findings which have been made in the environs of Lake Nemi. Beneath the slime and under the moss, treasures have already been found; but what was not the surprise of the world of artists and savants when it was announced, a few years ago, that two floating houses had been seen sleeping a few metres beneath the water's surface, and with what impatience were attempts made to bring them to dry land!

You were probably informed of this occurrence at the time, as well as of the discovery of certain artistic bronzes belonging to the mysterious ships sunk to the bottom of the "Speculum Dianæ." But difficulties without number speedily presented themselves, which caused the abandonment of the attempt to save these ships; silence would doubtless have fallen definitely upon the matter in spite of the great interest in it, if, recently, one of the engineers who had a share in the first researches had not been overcome with remorse because of so complete an act of forgetfulness and had not once more brought forward the matter of the galleys of Nemi, and suggested a new scheme for bringing about their salvage, a system which offered far less difficulty than those which had been attempted earlier under the impulse of feverish impatience.

I hasten to tell you that there is some chance that a decisive effort may be attempted to recover these rich relics which I mention; riches of inestimable artistic worth; for, apart from their rare sumptuousness, these floating houses surely represent a marvel, unique, which stands out from among all those memorials of our ancestors which up to this day we have discovered. This is not a palace, a temple, a public building, it is not a new example of Roman architecture, but it is a unique specimen of Roman naval art. Our King, Victor Emmanuel III, has just examined the scheme which would allow, as I have just told you, the bringing of these ships to dry land. He has shown himself disposed to accept the patronage of the committee which has this end in view. For the rest, here is a short description of what this new scheme is: —

Until now, the investigations have been carried on by divers who have studied the positions and dimensions of the two ships, and all that has been discovered has been owing to their efforts. But one fact had been discovered which made the saving of the ships almost impossible without lowering the level of the whole lake, and this fact is that they are in a large part buried in the mud, which has, as it were, riveted them to the place where they sank. Now, a sufficient lowering of the level of the lake presented almost insurmountable difficulties; so, for the moment, they were about to renounce all hope, if a new discovery had not turned up a short time ago which completely changed the situation. The lake of Nemi, like its neighbor, the Lago Albano, both enclosed in ancient craters, has an outlet pierced in the flank of the hillside which allows the overflow of its waters. You doubtless know under what historic circumstances, during the siege of Veii, the outlet of Lake Albanus was pierced; as to that of the lake of Nemi, there is the most complete ignorance as to its origin. But now we know that it is of a comparatively recent date, for another outlet, at a lower level, and still in good condition, has been discovered. It would be sufficient, then, to remove the matter which obstructs this ancient outlet, and, in parenthesis, besides the fact that in this way the two Roman ships could be saved, one could at the same time dry off the site of the ruins of the villa which Julius Cesar had built on the shores of Lacus Nemorensis, and which were covered by water after the level of the lake had been raised by the change in the level of the outlet.

A tradition prevailing among the inhabitants of the village of Némi, built almost perpendicularly above the lake, has always maintained that Roman galleys did exist beneath the waves. One circumstance confirmed this popular notion and the legends which prevailed for centuries, and that is that fishermen casting their nets to take the delicate fish which breed in quantities at the bottom of the lake have often had to abandon the attempt to bring their prey to the surface because the nets became entangled amongst obstacles which at first were of an unknown character. It was, therefore, approximately known about what spot in the lake must be sounded in order to discover these ships, for there was only one obstacle which could exist at such a place. Sometimes, moreover, bits of rotten wood were torn away and brought to the surface.

About the middle of the fifteenth century, Cardinal Prospero Colonna, Lord of Nemi and Genzano, two villages staged one above the other upon the hillsides which surround the lake, had had his imagination impressed by the tales which were current among the peasants; the legend, according to which the relics of the richness of the Roman emperors were rotting beneath the waters, seemed to him all the less ridiculous because he was so thoroughly versed in Greek and Latin letters and the arts; consequently, he would not have been at all unwilling to have his name attached to an enterprise which might assure him an imperishable glory. It must be remarked in passing that as for these sentiments, although any one of reasonable intelligence might hold them to-day, they were at that time really meritorious, for then the cult of antiquity was hardly in fashion or held in honor; the noble monuments of Rome had undergone numberless vicissitudes without finding in the popes and the lords of the aristocracy friends anxious to preserve for posterity these precious relics; the tomb of Cecilia Metella, the theatre of Marcellus, the Colosseum, the baths, the mausoleums, all that the barbarians had respected, were no more than fortresses about which the princes waged wars whose bloody struggles discolored Rome; and, when peace followed the civil wars of the Middle Ages, every ancient edifice was held to be merely a quarry from which any one, provided he was strong enough, could carry away bits of stone to build his dwelling, statues to decorate his palace and columns to adorn his churches. In short, this was the time when the Palazzo Farnese was built, and the Barberini and Cancelleria, and so many others, out of stones coming from the Colosseum, times when they overthrew a pagan temple in order with its precious marble columns to ornament a Catholic church.

Unfortunately, Cardinal Colonna, in spite of his wealth and learning, had not the means and apparatus adapted for so difficult a piece of salvage as that of the galleys of the lake of Nemi. He had to content himself with bringing from Genoa sailors of miraculous cleverness, capable, as it appears, of living beneath the water for minutes at a time, and swimming like veritable fishes. These past-masters in the art of diving set themselves at work and were not long before they definitely proved the existence of two large sunken ships. They even tried to save some portions of them, but we cannot too much felicitate ourselves that their efforts were not pushed with perseverance, for their means and methods were of the most primitive kinds. They dove to the bottom and fastened to the wood of the structures which they wished to raise great iron hooks made fast to ropes operated from the surface. One portion of the prow of one of the galleys, however, gave way and was brought to the bank.

All the wise men of science and letters in Rome, and Pope Pius II himself, hastened incontinently to the place. An author of the time has transmitted to us a recital of the astonishment which this learned assembly exhibited before such a "find" and a description of the bit of the prow plucked from the ship. "It was composed," says he, "of big planks, 3 inches thick, of the wood named larch-wood; it was covered all over with a good coating of yellow or purple, and upon this were fixed with thick bronze, not iron, nails a large number of leaden plates."

Another discovery of the time was that of the leaden pipes which brought to the ships fresh water from neighboring springs. It was understood from these things that one was really in the presence of two floating houses, two lacustral palaces rather than simple galleys; and these leaden pipes bore inscriptions from which could be deduced that which tradition already affirmed; that is to say, that these submerged dwellings had been built by Tiberius. All these objects were disposed of, we now do not know how or where; they have never been rediscovered in our time.

A century later another attempt was made. A certain Francesco de Marchi, a Bolognese soldier, this time himself descended to the bottom of the lake, using one of the rudimentary instruments which

allowed him to breathe for a certain length of time under water. We don't know quite what this instrument was, for De Marchi left only an incomplete description of it, in which he simply said that the invention was due to Maître François de Lorraine, and that the latter had made him swear never to reveal to any one by what mechanism the renewing of the air was effected.

De Marchi details his discoveries at length, but it seems to be plain from his tale that he made only a single descent of any length of time — an hour — during which he bound together and had pulled to the surface a large quantity of beams and planks of cypress-wood and pine. He said that he saw great iron rails eaten by rust, small bronze nails which fixed leaden plaques over the bottom, and brought away portions of the brick floor, 3 spans wide in each direction and 4 inches thick, also another portion of flooring of a beautiful red enamel. He also saw chambers in the interior of the ship, and leaden pipes, but nothing of what he brought to dry land remained, for robbers, thinking that they were stealing the secret of his submarine machine, carried away everything.

Another spell of silence, this time lasting for three centuries. But tradition was not going to abandon its belief after the experiments which we have spoken of had proved the existence of the vessels, whether they were built by Tiberius or by some other emperor.

Finally, on the 10th of September, 1827, Chevalier Annesio Fusconi made a new attempt. He employed a diving-bell invented by Dr. Halley, and this instrument stood for an immense advance, since eight workmen could work at the same time, receiving air through a pump placed on a raft above. This is how Fusconi tells the success of that day's work: —

"The workmen descended in the diving-bell, and after a short time gave the signal agreed upon; we pulled them up, and they brought us, amid the unanimous applause of those present at the operation, bricks framed in iron with the inscription 'T I B. C A E S,' and several metal nails." Later success did not give the lie to this first descent. "We did the same things on the following days up to the 28th of this month, a date at which a round metal object, which the workmen could never properly describe, was made fast to be pulled to the surface, but the ropes gave way."

But once more the robbers appeared, for, during the winter, the investigations were suspended, and they seized the apparatus of the unfortunate Fusconi. Let us pity the misfortune of this generous man who had paid out of his own pocket 30,000 francs for the construction of his machines. But it must be agreed that the proverb "Misfortune is good for something" has some truth in it, seeing that Fusconi, in his ignorance, proposed simply to draw the vessels from the water bit by bit, believing that it was impossible to recover them whole. The objects which he had discovered were those which his predecessors had seen: bits of wood, nails, leaden pipes, and, moreover, a bronze capital, marble tablets, a fragment of grille-work bearing the inscription "T I B. C A E S," and forty large bricks of terra-cotta, two of which were framed in iron, as were those described by De Marchi. Fusconi also said that his workmen saw at the bottom of the lake statues, columns and metal beams which could not be drawn out of the water because the cables would not stand the weight and broke during the operation.

A large portion of the objects recovered at this time were purchased for the Academy of St. Luke by Cardinal Camerlingue.

. . . . . .

All that precedes relates to efforts made in the time of the government of the Popes to save the Roman galleys, but the great political changes took place after 1827, the time of Fusconi's explorations, and new obstacles were created, while science considerably minimized those obstacles which caused the failure of the attempts made up to that time.

The rights of the State in artistic treasures have been recognized for a long time; the Pacca edict against the exportation of anything which might have the character of a work of art was the first affirmation of these rights and dates from the commencement of the nineteenth century. Later, when Italy was organized as a single kingdom, the *régime* of objects of art was definitively fixed, always in a manner favorable to the State. This brought it about that every private attempt at saving the Roman galleys encountered insurmountable obstacles. The State claimed its rights in any objects which might be discovered, hindered all speculation in their value, and especially prevented their exportation. No one, therefore, was inclined to cast into the water enormous sums for the good pleasure of the Italian Government, who, on its side, is generally thinking of other things than archæology. On the other hand, the lake of Nemi is private property, one of the fees of the very ancient patrician house of the Orsini, and this fact made it impossible that any one should undertake to investigate the galleys without the authorization of Prince Orsini.

In any other country, let us say in passing, both government and prince would perhaps have been rivals in their ardor for the recovery of the Roman ships, if it were only for the sake of having their names attached to an enterprise capable of making its author forever celebrated; but here it was quite otherwise. In 1895, a Roman antiquary was making some excavations in the neighborhood of the lake and particularly on the very site of the famous Temple of Diana and had the idea — which may have been suggested to him — of seeking by skilful sounding the exact position of the galleys, with the hope of saving at least some parts of them. He entered into a contract with the Orsini family in which he bound himself to attempt at his own risk and peril the necessary researches, and had them begun at once by a diver at the point indicated by tradition and the earlier explorers as that where the Roman galleys had been rotting for centuries.

The results of these attempts are known; it was an unexpected revelation, a very thunderclap. Much was spoken at that time about the marvellous bronzes of Lake Nemi, and especially of the bronze head of Medusa, a piece which far exceeded all that any one had hoped for in the way of the splendors of these floating palaces. How many artists of the Renaissance, even the greatest ones, would have been happy to sign their names to such a morsel! This head is treated with great skill; the beauty of Medusa is heightened by the expression of atrocious suffering which she endures; the artist who created the bronze profoundly realized the misfortunes of this mythical personage and the terrible power which the gods granted to her as chastisement for her faults and pride.

The archæologists were equally interested in the bits of enamelled work and vitrified compositions which evidently belonged to mosaic floors. This mosaicwork seemed to form an "*opus sectile*," that is to say, a pavement composed of marbles of different colors, cut in shapeless pieces of regular size fitting one against another, so that when everything was in place designs and figures of the most beautiful effect were produced. This rich "*pavimentum*" is more beautiful and richer than those famous ones which are found in the palace of Caligula on the Palatine.

Such was the success of the investigations carried on about the first galley. But the existence of a second one could not be doubted because of the attempts made in the earlier centuries, so they came upon new discoveries, the most important of which was a bronze hand resting upon a plaque of the same metal and which was apparently a "*manus averrunca*," that is to say, an amulet against bad luck, which was ordinarily placed at the stern of ships to attract favors and the protection of Fortune. This "*manus averrunca*" must have belonged to an epoch earlier than that of the bronzes of the first galley; it is by the rigidity of the forms and the harsh lines of the fingers that the archaic character of the bronze is recognized.

But the Italian Government, fearing that the antiquary who had undertaken the partial salvage of the ship might do damage in his attempts to get hold of some of the objects of value, laid an injunction on him, and ordered that an official inquest should be held to study above everything the position and the dimensions of the galleys in order that later they might determine the most practicable way of raising the vessels from the water. The inquest, which was entrusted to a naval officer and some divers from the Government arsenals, gave the best results and the most exact data: the first galley is 20 metres from the bank; its length is 64 metres, its breadth 20; the stern is at a depth of 5 3 metres; the prow is lower, being 12 metres below the surface; the broadside has given away about the centre for a length of 3.4 metres. The second galley lies 50 metres from the bank; its length is about 71 metres, its width 24.4; its stern lies at a depth of 16.6 metres, and the prow pitches towards the centre of the lake to a depth of 22 metres. This galley has given away for a length of 2 metres on the starboard side. The distance between the two galleys, from centre to centre, is about 200 metres.

It must be noticed that these investigations have had to be carried out on a steeply inclined bottom, since there is a difference of about 17 metres between the stern of the first galley and the prow of the second, and there is some apparent probability that a certain number of the ornaments, furniture and utensils which were aboard may have slipped down to still greater depths. The hulls of the galleys, as I have said above, are not entirely free; the first is almost wholly submerged in mud and slime; there is only the upper portion of the deck which is free. A deck seems to start from the stern, which has a peculiar form like a fan, towards the centre of the ship. The second hull emerges from the mud for a length of about 40 metres, but the stern is completely covered; the interior, however, seems empty.

The manner in which these galleys were built, a manner which caused the liveliest wonder amongst the first divers, deserves to be briefly described. Planking is fixed to the framing by copper nails; they are lapped and held in place by long bolts; moreover, they are made fast on the inside by pins of resinous wood. The planking is covered with a compact cement over which is stretched some thick woollen stuff. And, finally, everything is protected by the plates of lead which we have mentioned.

Now let us turn to the methods which might be used in the salvage of these vessels. There are two distinct methods: first, the absolute hoisting of the vessels from the water, and, second, the lowering of the level of the lake. The first method would be preferable; for the lake of Nemi being one of the most picturesque in Italy, affording a landscape of extremest beauty, that artists and foreigners who come to Rome hardly ever miss visiting, it would be a great pity to remove one of its decorative features, this little pool of tranquil water, the "speculum Dianæ," which really forms its chiefest ornament. But for the system of direct hoisting, it would be necessary to construct a small city on rafts above the vessels and clean away in some degree the bottom of the lake in order to remove the mud, and then, possibly, slide ropes under the hulls and set in motion cranes of great power. All this presents a very grave inconvenience. Almost all of the objects of art which used to form the riches of these galleys have slipped out of the hulls and now lie buried in the slimy mud at the bottom. One would run great risk, therefore, of withdrawing from the water only the carcasses of the galleys, to say nothing of

the difficulty of saving them whole. The engineers could not gather a very exact idea of their position and the force of the resistance which would be opposed to the cranes, and the least error in the distribution of the strain, which ought to be regulated according to the weight of that portion of the ship to which it is actually applied, might compromise the outcome of the enterprise.

They are thinking of making a decisive attempt which may be crowned with the most startling success because there has been discovered, as I said above, an outlet at a lower level than that through which to-day the lake discharges its overflow, and which is in a better condition. This is Roman work, a long tunnel with a considerable section, measuring 1.6 metres by 1 metre. All that would have to be done would be to clean away obstructions and through the cleared outlet the level of the lake could be lowered by 9 metres. Then they would build at its mouth the short arm of a siphon, dipping below the water, and through it successive layers of water, which still covers the floating houses of Tiberius, could be sucked out of the ancient crater.

As you see, this scheme is fairly practicable. The cost of the undertaking would not be enormous, and what would be a very great advantage, and practically the one condition under which these famous vessels can be saved, is that the work would be done, as it were, on dry land.

This is what they are undertaking to carry out, a campaign which has long been the dream of Italian and foreign archæologists, and it would be very helpful if the King should decide to accept the patronage of the committee which is going to be formed. He is young and bold, and has already given proof of a high degree of erudition. He cannot fail to be interested in the events we here speak of.

Already there is talk of erecting a Roman naval museum where might be deposited these Roman barques and all the ornaments and rigging which might be recovered. This would be one more attraction for Rome, and one can feel certain that it would be carried out with care and intelligence, for although in Italy things are undertaken with considerable sloth, yet, when they are undertaken, they are carried out properly.

H. Mereu.

TECHNICAL AND SCIENTIFIC BOOKS.[1]

"THOSE who are actively interested in engineering education cannot help but feel a certain sense of responsibility for the remarkable record of industrial development which the last few decades have made. For substantiation of such claim attention need but be called to the captains and other officers of industry who have been trained in the technical schools of the country. The inadequacy of the engineering education of thirty years ago for present conditions is scarcely more obvious than the fact that engineering education of the present will not suffice for the future. Present methods, continued indefinitely, would develop leaders, as they have done in the past, but the question of a debatable nature may be raised: Is the country better off with a few great engineers or a large number who are capable? Perhaps the most serious limitation upon engineering education at the present time is its failure to reach the rank and file of industrial workers, a limitation which is steadily increasing in degree. In spite of the fact that some of our advanced technical schools are free from tuition charges, it is evident that only a very small percentage of the inhabitants seem to be endowed with the privilege or opportunity of attending such institutions. It has been estimated that one per cent of the pupils of the grade-schools continue their work beyond the high-school.

"It seems to be the predominating idea at present that increase in efficiency of engineering education lies mostly with reference to the instruction of the favored minority who are able to attend technical schools. This is shown by the action of the leading engineering-schools in increasing the height of the barrier commonly termed entrance-requirements, thus more noticeably decreasing the percentage of those permitted to attend. A college education gives to its possessor an advantage over his fellow-men and almost ensures for him promotion to the more important positions, thus serving in a considerable degree to remove the less fortunate from the line of promotion. This stratification which appears to be developing, placing the technical graduate in the upper layer and creating an engineering aristocracy, is to be deplored as contrary to the American doctrine of equal opportunity for all. By the very progress of the technical graduate the outlook for the shop-man or machine-laborer is darkened, for, seeing the higher positions apparently closed to him, he will lose that incentive which is the underlying foundation of American enterprise, hope of advancement. He will feel that he is born to a position in life from which he cannot rise. The solution of this problem as to how such condition may be avoided is perhaps the most difficult and important task which those interested in technical education have to undertake; but there is no doubt that American ingenuity will find a way of satisfactorily solving this, as it has done other great problems. Various experimental solutions are now under trial and others have been proposed. Among the former are the so-called correspondence-schools, summer-schools for artisans, which at least one of our universities has instituted, night-schools, classes conducted by the Y. M. C. A., instruction offered by manufacturers, and various other methods, each of which has its own advantages and disadvantages which it is not my purpose to discuss.

"The great school for the industrial worker is the shop or the factory. The worker in this school is in a laboratory of the most efficient sort, in which he can develop efficiently, if he will develop, his brain, together with manual skill and dexterity. The workman must first be taught to realize that unthinking skill can never hold its own against brain-training. After instilling this feeling, every possible opportunity should be given to make the work of brain-training as simple and efficient as possible. The correspondence-schools, in having enrolled over a quarter of a million students, have demonstrated the state of intellectual hunger which prevails among the industrial workers of the country. In addition to demonstrating the existence of this hunger, at least some of the schools have done much toward satisfying the same. The proficiency of the industrial worker lies largely in his knowlege of the laws of nature and their applications and limitations, and an ignorance of such laws determines to a large extent the difference between the mechanic and the engineer. Such laws and applications may be learned from books, and in this fact lies the opportunity which the libraries have for furthering industrial progress.

"There are various ways in which the librarian's work may be to the advantage of engineering education, by which term is meant the dissemination of knowledge which bears upon and influences industrial development. The library may supply such scientific and technical literature as will meet the requirements of those who wish to use the same for recreation or for general information, and therefore including writings of a popular nature. The library may stimulate interest in scientific and technical matters among high-school students and others who are to choose their life's work. The means may also be offered to technical men for continuing their studies, or in carrying on investigation, for which purpose a good reference equipment is requisite.

"The library, in placing at the disposal of the workman-artisan class the literature best suited to their needs may accomplish results of inestimable value. 'The vast number of workers, so important to the future welfare of the Republic, deserve and are in need of more consideration and encouragement for self-education than are those who constitute what are known as our educated classes.' It is to the means of giving aid to this class that I wish especially to point. Libraries have been and are at the present time very inefficiently dealing with this matter, the following remark recently made by a prominent technical man emphasizing this point: 'Instruction in engineering literature is not organized, it is not looked after, it is not cared for, yet it is one of the most important questions. On entering a modern public library one finds excellent reading-lists upon almost any topic in history, art, literature and some science, but none on engineering or technical subjects.' A study of methods of increasing the efficiency reveals some of the causes of inefficiency, principal among which is the lack of a sufficient number of books, and, what is equally harmful, the presence on the shelves of books whose influence is not only indifferent but actually harmful.

"Certain branches of engineering and science, especially those capable of spectacular treatment, have been subjected to a flood of literature during recent years. The greater part of such literature, in spite of popularity as shown by calls for the same, is not only unreliable and worthless, but is actually harmful and a hindrance to true progress in engineering education. It is to be deplored that those who represent the most advanced learning in their profession seldom indulge in the writing of elementary books, since the financial reward for such work is not comparable to that which may be received in more strictly professional work. The writing of the elementary book is therefore left to the amateur engineer. The public demand may seem to make it necessary to place many undesirable books on the shelves, but it seems to me that just as much care should be used in barring misleading books in science and engineering as in excluding those which are detrimental from the moral standpoint.

"In arguing for the organization and more efficient operation of scientific and engineering departments in the public library, with the view of helping especially the working-class, I am well aware that nothing new or heretofore untried is being presented. I will anticipate some of the objections which may be raised against this system for industrial betterment. It will be argued that certain libraries have maintained technical departments at considerable expenditure of capital and labor, but that little interest has been manifested in the same by the people who were to be benefited. It is true that only a small percentage of the industrial workers seem to have an ambition to rise, strange as this statement may seem, and even if possessed of such, few have the enterprise to do the extra work necessary to further this ambition. The results, however, which can be effected by ministering to the requirements of those who have both ambition and enterprise, even though such number be small at present, is a sufficient argument for carrying on the work. In this way the library may serve as a net spread wide to catch the talent which the country produces.

"It may be said that manufacturers have installed libraries in connection with their works, and have even offered free instruction to their employés. The indifferent success which such attempts to improve the men have met points to possible failure for public libraries, if they take up this work. It has been a matter of common experience, however, that advantages such as gratuitous instruction offered by employers are seldom appreciated by employés, for the majority become suspicious of the intentions, feeling that such efforts are being made in the interest of capital rather than of labor. To the library this is a matter of less moment, for the public may be

[1] Portions of a paper by Prof. C. F. Burgess, of the University of Wisconsin, read at the Annual Convention of the American Library Association, June 20, 1902.

made to have a feeling of ownership, which is synonymous with a feeling of interest. There may be means whereby the library may increase such interest. An experiment with this in view is to be tried by the public library at Madison, Wis., during the coming winter. It is proposed to have a series of informal talks, or lectures, given to the employés of local factories upon technical subjects which may be of interest to them, a small charge to be made for the course. The proceeds are to be used for the benefit of the technical library, books and periodicals being purchased which will be of most service to the contributors. Experience has shown that a free course of lectures will not retain the interest of the audience as will a course in which money is invested, and in addition to retaining such interest, it is thought that the investment of the proceeds as before mentioned will increase the interest in the library. The lectures are to be given by local engineers and professors of the College of Engineering of the University of Wisconsin. Almost any public library can easily get up such a course of talks, as the technical men of the community will readily lend their assistance.

"The library to be a place of study requires a good list of reference-books and journals. Current technical and trade-periodicals would be a drawing card, and those who possess, even to a minor degree, the ability of self-education, will find here their mental nourishment. In almost every industry there are now technical books and trade journals and catalogues of very high educational value which may be acquired at a very small cost. A most valuable part of engineering and scientific literature is in such publications, and with bound volumes of the same the librarian might readily compile reading-lists for those who desire to look up any particular line. By suitable scientific instruction the usefulness of the industrial worker to society is increased, his horizon is broadened, the dignity of his calling is developed; and no other agency seems as universally suited for furnishing such instruction as does the public library."

A NEW YORK STUDIO.

HWAY up above the bustle of the street on the corner of Sixth Avenue and West Fortieth Street is a suite of apartments that, to say the least, is a novelty in New York. Mr. A. A. Anderson, an artist, who for many years presided over the art-colony at Paris, has erected on this corner a building known as the Bryant Park Studios, of which Mr. Charles A. Rich was the architect, and while laying out the whole building for the exclusive use of artists and art-patrons, he has therein built a suite for himself as an example of what he deems a studio should be. Choosing for himself the westerly side of the building, across the north ninth and tenth stories for his entrance, and the whole of the upper central part for his working-studio, the whole suite shows the perfection of plan which is possible with a thorough knowledge of the needs of an artist.

Entering a small private hallway one is admitted to the private living-suite of the owner, which contains also a small studio. The first room is the reception-room, a most perfect example of Louis XV decoration. The walls are moulded into panelwork of pure white, having the ornamentation of most exquisite design, with the large emblematic centre cartouches of raised work in low-relief. The ceiling, also laid out in panels of refined design, is elaborately ornamented in relief, and the doors are carved in the beautiful flowing lines of the period. All this ornamentation was made in Paris by Parisian workmen. Opening from this room is the chamber, also in the same style, of simple design, with marble mantel, circular ceiling ornamentation, and walls covered with delicate French silk in upright stripes.

To the south is a bath-room of marble and tile.

Returning and passing through the reception-room, beyond is the small studio, a room 25′ x 25′ in size and 20 feet high, in the style of Francis I. The room is formed by dark oak panelled wainscotting 10 feet high, with an ornamental carved band-course for its capping, above which the room is again panelled off by rich dark green tapestry in oak framework.

In carrying out the style of the room the ceiling is composed of very deep and very thin beams only a few inches apart, these beams being decorated in gold. The effect of this room is exceedingly beautiful and is strengthened by the large columniated mantel, richly carved, which runs to the ceiling, and is flanked on the opposite side by a hanging balcony with carved balustrade. Spanish tapestries from Salamanca drape this room, and the high studio-windows send down a flood of light from the top, and show another balcony with pierced railing which discloses the dining-room. Aside from the actual beauty of this small studio, its fittings are so arranged that backgrounds of the different periods may be properly set.

A hallway leads back through the entrance-hall, and we ascend the oak staircase and enter the dining-room from the second-story hallway. The room is strikingly beautiful, for it has a groined ceiling in dull gold which smacks almost of the feudal period, and the same spirit is carried out in the Gothic mantel with its pointed arched canopy. We look out from this room into the studio below, and passing along the balcony of that room approach the Grand Studio, which occupies the entire centre of the roof of the building, and from a promenade along the front of which we can look down upon the quiet green foliage of Bryant Park. This studio is 50′ x 50′ and 30 feet high. Its wall-surface is simply a quiet tone, as befits a studio, but its enrichments in the way of form and embellishment, while equally quiet, are rich in the extreme, and have been the sole study of Mr. Anderson. A large organ occupies one corner, under which is seen a glimpse of Damascus in all its Oriental splendor. A beautiful old entrance which once graced an Italian palace gives entrance from the other corner to a charming palm-garden, for which the rich golden doorway forms a framework setting off the soft greens of the shrubbery. Between these two features is a noble arch running to the ceiling, with balcony, draped with a gorgeous Beauvais tapestry, while a draped entrance beneath gives access to the private elevator.

But while the above seems to indicate mere luxury of surroundings, the perfection of the studio planning is apparent, for the entire north side, while admitting a flood of light, is controlled by a skilful arrangement of sliding-screens which will give any gradation of light, from the full clear light of a northern sky to total darkness. The entrance to this large studio has been made from a balcony off in one corner, so as to afford the best *coup d'œil* to one entering.

Mr. Anderson's pictures and portraits are everywhere about the room furthermore, and are evidence of his diligent work. While a most beautiful place, this studio of his is still a workshop where the study of years is made permanent by the hands of a man who loves his art and whose whole life has been given up to its study. L.

MODERN METHODS OF SEWAGE-TREATMENT.[1]

SEWAGE can be defined as the water-supply of a city after it has been used. It contains solid and liquid excreta, household waste, street-washings and the refuse of industry. The total amount of refuse varies, but on the average city sewage is pure water containing one-tenth of one per cent of waste; 7 pounds in 1,000 gallons. In addition sewage contains approximately 150 millions to the liquid ounce of those microscopic organisms called bacteria. Only very few are harmful to man, but in the perfect treatment of sewage bacteria as well as refuse must be removed. Perfect treatment of sewage, i. e., changing sewage back again into a water-supply, is possible, but at present not practicable on account of cost. All that so far has been attempted has been to remove the polluting substances, so that when emptied into a stream the sewage can cause no offence.

The earliest method of treatment, which was merely disposal, was to carry the sewage into the ocean or the nearest stream. This dilution is allowable for cities situated on the sea, or on rivers whose flow is as compared to the sewage 100 to 1, and the unfiltered water of which is not used as a water-supply. Very few cities are so fortunately situated as to make use of this method. For most cities the treatment or purification of sewage is as imperative as the obtaining of pure water. How this can be accomplished is one of the great sanitary problems of the day. The six principal processes in historical order are, sewage-farming, chemical precipitation, intermittent filtration, contact-bed treatment, septic-tank treatment, continuous filtration. Sewage-farming is applying the sewage to cultivated land. Chemical precipitation is adding certain chemicals to throw down the polluting substances. The four remaining methods, the so-called modern methods, are all based on the fact that the micro-organisms or bacteria always present in sewage will, under proper conditions, destroy all the obnoxious substances contained in sewage.

Sewage-farming; based on the idea that plant-life was capable of decomposing organic matters in sewage almost without limit, with resulting perfect purification and immense profit from making use of the polluting substances for plant-food, resulted in failure, except in those few cases where the land was of an exceptional character and of very large area.

Chemical precipitation, consisting of adding lime and iron sulphate to crude sewage and leaving the supernatent liquid clear of suspended matter, but containing practically all the soluble putrefying substances, is costly, and removes only about 55 per cent of the total organic matter in the sewage. The effluent will putrefy, and consequently cannot be emptied into a small stream, while the precipitate is difficult to treat, and is valueless. Sewage-farming and chemical treatment are now considered as methods of the past, and all the modern methods of disposal are the so-called bacterial methods.

The first of these methods was intermittent filtration. As early as 1865 Dr. Alexander Miller, of Berlin, showed that by passing sewage intermittently through sand, the obnoxious substances were removed, but the explanation is of much later date. It is now known that fresh sewage contains bacteria which live on dead organic matter and which cause its decomposition. These bacteria are roughly divided into two great groups, the anaërobic and the aërobic groups. The anaërobic group live, grow and multiply best out of contact with air and light; the aërobic live, grow and multiply only in contact with air. Each group plays its own special part in the destruction of the effete matter in sewage. The anaërobic bacteria act first. They disintegrate the solids, and bring them into solution. The aërobic bacteria act upon the disintegrated and liquefied compounds and, by oxidation, change them into harmless gases or minerals. Both groups of bacteria are necessary. By passing sewage intermittently through a suitable material, conditions favorable to the bacteria are brought about and the obnoxious substances are destroyed by the aid of these microscopic organisms. A suitable material was sand, and by applying the sewage only six hours out of the twenty-four, the conditions favorable to the action of both anaërobes and aërobes is maintained. By this process from 50,000 to 75,000 gallons of domestic sewage, not containing manufacturing waste, can be purified each day on one acre. Intermittent filtration is undoubtedly the best method known

[1] Portions of a paper by Dr. Leonard P. Kinnicutt, of Worcester, Mass., read before the American Association for the Advancement of Science.

for cities and towns which have in their neighborhood comparatively large areas of sandy soil.

It is not practicable for those which would be obliged to construct beds with sand brought from any distance. Investigations started by their problem seem to show that, by allotting distinct abodes to the anaërobic and aërobic bacteria, purification can be more rapidly carried on. The abode allotted to the anaërobic bacteria is called the septic-tank, that allotted to the aërobic bacteria, contact-beds or continuous filters. The septic-tank is only a modified cesspool, an open or closed tank through which the sewage is run continuously, but very slowly. The sewage itself contains anaërobic bacteria, which in the tank, out of contact of air, increase immensely, and bring about putrefaction, or fermentation, giving a product which is no longer crude sewage, but a sewage in which a large amount of the solid matter has been liquefied or changed into gas. The change which sewage undergoes in this fermentation process is very marked. The carbohydrates, like starch, sugar, wood, fibre, paper, are broken down and partially liquefied; the nitrogenous substances are liquefied, and the fats are partially decomposed. In this process, as in all processes of fermentation, gases are evolved and may be conducted off, and used as a fuel or an illuminant. This self-purification removes about 50 per cent of the putrescible substances in sewage, and its great practical value is that it reduces the amount of sand-area required for purification of sewage, increasing the capacity of an acre of sand-bed per day from 50,000 to 75,000 gallons to about five times as much.

Further, the septic-tank has made the English method of contact-beds possible. This method differs from intermittent filtration in that the sewage, instead of being applied slowly and allowed to drain through a bed of sand, is run rapidly into a water-tight bed filled with a coarse-grained material, as cinders, coke or broken stone, and retained in the bed for a given number of hours, after which the liquid is quickly run out of the bed. The action of a contact-bed depends on the presence of aërobic bacteria, which coats every individual piece of filling-material with a slimy growth. If, however, the bacteria slime increases beyond a certain point, the void spaces fill up, and the bed becomes spongy and will not allow the water to drain away. Can this growth of organisms be regulated, and is serious trouble to be apprehended from the deposition of the non-putrescible part or ash? These are the two points about which there is a great difference of opinion among English sanitary engineers.

My own opinion is that crude sewage cannot be successfully treated and should never be attempted, but that sewage, clarified by chemicals or by fermentation in the septic-tank, can be successfully purified. With such sewage the contact method offers to towns or cities where large areas of sand do not occur a process which, to be successful, requires merely the personal oversight of a well-trained sanitary chemist or engineer.

With the diversity of opinion regarding the practical success of the contact-bed, there has arisen a growing interest in the so-called continuous-filtration method. Continuous filtration is an attempt to still further increase the amount of sewage that can be treated on a given area, to treat 2,000,000 to 3,000,000 gallons in place of 500,000 gallons per acre per day. This method is based on the idea that if air is supplied to the filter at the same time that the sewage is being run upon the filter, and the filter is of such a construction and so drained that fresh air continuously remains in the filter, there is no necessity for periods of rest as required by the intermittent and contact-bed methods, as the only object of periods of rest in these methods is to supply sufficient air to the bacteria. Undoubtedly continuous filtration has certain merits, especially that of being able to treat larger quantities of clarified sewage on a given area than any other bacterial process; but even if it accomplishes all that is claimed, it is a process that requires a great deal of oversight and attention.

In conclusion, I would say regarding the various methods I have mentioned, that sewage-farming as a general method of sewage-treatment is not practicable; that chemical treatment only removes a part of the polluting substances in the sewage, and is advisable only in cases where sewage contains germicidal substances, thus preventing the use of the septic-tank; that intermittent filtration is the best of all methods for the treatment of sewage of cities where sand can be easily and cheaply obtained; that the septic-tank process is a most valuable adjunct and almost an essential part of all bacterial methods of sewage treatment; that the contact method is not adapted and should not be used for the treatment of crude sewage, but can be considered a very satisfactory method for the treatment of sewage after it has undergone putrefaction in the septic-tank; and that continuous filtration, though capable of treating much greater quantities of sewage per acre than can be done by any other method, is still in the experimental stage.

THE NEW TARIFF-RULINGS ON AMERICAN ART.

IT seems reasonably certain that the difficulties of the American artist over the admission into this country of work done while abroad are now at an end. On June 21 last the Treasury Department issued a document received at the New York Custom-house last Thursday, and defining the present position of Secretary Shaw on the puzzling question at issue. The substance of this document, which is based largely on recent decisions, is as follows:

Paragraph 703 of the Act of July 24, 1897, provides for the free entry of "works of art, the production of American artists residing temporarily abroad;" and the following rulings under said paragraphs are published for the information and guidance of all concerned, viz:—

1. The privilege accorded by paragraph 703 extends without limitation as to duration of residence abroad, provided, however, that the artists have not renounced or intended to renounce their American citizenship, but avow, in the manner prescribed by the regulations of the Secretary of the Treasury, their intentions of returning to the United States at some later period; and it is accordingly held that long periods of residence abroad, in one case of 27 years, of American artists are "temporary" within the meaning of said paragraph 703. Domicile consists of residence at a particular place, accompanied by an intention, either positive or presumptive, to remain there permanently or for an indefinite length of time. It embraces not only the fact of residence at a place, but the *animus manendi*, or intent to regard and make it the home. It is therefore held that the privilege of the free admission accorded by said provision of law to works of art of American artists residing temporarily abroad is extended to American artists without limitation as to duration of residence abroad upon the filing of the appended declaration:—

2. Children born abroad of citizens of the United States who have not renounced such citizenship are citizens of the United States by virtue of section 1993, Revised Statutes, and therefore entitled to the privileges accorded by paragraph 703.

3. A wife's political status follows that of her husband, and it is accordingly held that a woman by birth a citizen of the United States who has married a Canadian expatriates herself by the act of marriage; that she cannot be considered as residing temporarily abroad within the meaning of paragraph 703, Tariff Act of 1897, providing for the exemption from duty of "works of art, the production of American artists residing temporarily abroad"; and that the privilege accorded by such provision cannot be extended to works of art produced by her.

4. In the case of the importation of works of art of an American artist residing temporarily abroad, it is required that the work shall be positively identified as such production by the declaration of the artist, or of witnesses of such production, and such other evidence as may be required to establish the facts to the satisfaction of the Collector of Customs at the port of importation, and a consular certificate of identification or bond therefor is not necessary in such cases.

5. Works of art of an American artist are free of duty, notwithstanding the death of the artist and transfer of ownership of the works.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

PLANS AND ELEVATION: UNITED STATES POST-OFFICE AND COURT-HOUSE, SAN FRANCISCO, CAL. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

DETAILS OF INTERIOR FINISH OF ONE OF THE COURT-ROOMS OF THE SAME.

GROTESQUES; — ARCADE TO PROMENADE: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

ENTRY DOORS: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

[The following named illustration may be found by reference to our advertising pages.]

"MOONHILL," CUCKFIELD, SUSSEX, ENG. FOR WALTER LLOYD, ESQ. MR. P. MORLEY HORDER, ARCHITECT; MR. THOMAS H. MAWSON, LANDSCAPE ARCHITECT.

THIS plate is copied from *Building News*.

[Additional illustrations in the International Edition.]

SMALL TOWER ON WOODLAND AVE.: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

UNIVERSITY OF PENNSYLVANIA DORMITORIES FROM THE BOTANICAL GARDEN.

INTERIOR FINISH IN THE LIBRARY OF THE UNITED STATES POST-OFFICE AND COURT-HOUSE, SAN FRANCISCO, CAL. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

STUDIO OF A. A. ANDERSON, ESQ., BRYANT PARK STUDIOS, NEW YORK, N. Y.

For description, see article "A New York Studio" elsewhere in this issue.

PRESENT CONDITION OF THE UNITED STATES POST-OFFICE AND COURT-HOUSE, SAN FRANCISCO, CAL.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"COLLAPSE OF THE STEEL-CONCRETE ELEVATOR AT DULUTH."

PHILADELPHIA, PA., July 2, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — We would like to call your attention to an error in your editorial of June 7th on the "Collapse of the Steel-Concrete Elevator of the Peavey Grain Company, Duluth."

The statement is made by you that — "Assuming a pressure of 50 pounds per square inch near the bottom of the bin, there would be a lateral pressure of about 72 tons upon a ring 8 inches in height." This is true to the extent that the total pressure upon the ring *normal to its inner surface* would be about 72 tons, but it is not true that the whole of this pressure would be exerted to rupture the ring. Only the component of these forces, acting perpendicular to a diameter passed through any point where rupture may be supposed to occur, has to be considered, and the ring would, therefore, have to be strong enough to resist a tensile-stress of about 12 tons. A bar $4'' \times \frac{1}{2}''$ would seem to be ample, even allowing for the material removed at the joints.

We are not undertaking to defend in any way the design of the structure in question, but we do not want you to make the case out any worse than it is, as we are interested in "steel-concrete" construction in general, although we have no connection whatever with the Peavey Company or with the concern who did the work for them.

Yours truly, MERRITT & CO.,
JAS. L. MERRITT, *President.*

NOTES AND CLIPPINGS

STORAGE BATTERIES. — The storage battery is coming more and more into evidence, as its value in certain situations and the proper methods of handling it get to be better understood. It has suffered in the past more from external ignorance than from internal defects. Applied in many instances to meet conditions to which it was not adapted, usually overworked, nearly always uncared for, it has been the ugly duckling of the electrical art. Engineers generally know but little about it and its limitations. They frankly admit the fact, and seem to care little that it is so. Electro-chemistry is out of their sphere, they say, and battery mathematics are not intricate enough to attract the learned. The truth remains, however, that the storage battery is a good friend, and an ever-present help in the time of trouble, if it be properly laid out and installed, and does not suffer from persistent neglect. Altogether, there seems to be a growing demand for power batteries, and as their limitations and operation become better understood their performance will become more satisfactory and their dividend-paying possibilities greatly increased. The storage battery has an important place in industry, and with the exercise of proper care in its handling it will undoubtedly justify the claims of its exponents. — *N. Y. Evening Post.*

THE STRAIT OF CANSO BRIDGE. — The bridging of the Strait of Canso between Cape Breton and the mainland of Nova Scotia will be undertaken at once. The task involves great engineering difficulties, and an outlay of about $5,000,000. J. A. L. Waddell, of Kansas City, has been engaged to oversee the work. The bridge will be a cantilever, with a span of 1,800 feet, and will have a height of 58 feet clear above high-water. — *Exchange.*

THE WESTMINSTER PRESBYTERIAN CHURCH, BALTIMORE, MD. — One of the most historic spots of this city is the site of the old Westminster Presbyterian Church, which will celebrate its fiftieth anniversary, beginning next Sunday, with elaborate and appropriate exercises. This church was built in 1852 in the old Westminster graveyard at the corner of Fayette and Greene Streets, that site being selected in order that the church might protect the yard, in a way, and keep it in better condition, although the ground is held by the trustees of the First Presbyterian Church, corner of Madison Street and Park Avenue. The founders of Westminster Presbyterian Church were members of First Presbyterian, Franklin Street. The position and mechanical construction of the church are quite out of the ordinary. As the yard was well filled with graves and vaults, before the construction, pillars 7 feet high were erected between the mounds, and upon these pillars is the foundation of the church, leaving an open space beneath the church of ample height for visitors to stroll between the graves. For about fifty years John Spence, the gravedigger, and also sexton of the church, had a unique apartment in the corner of this lower space, where he lived alone with his large dog — a great Dane — which he called "Poe." The furniture of this room consisted largely of tombstones. His table was a vault about 4 feet high, while smaller stones served as chairs. In addition to these articles he had a couch on which he slept each night. Mr. Spence died a short time ago. — *Baltimore American.*

TRADE UNIONS IN GERMANY. — The fourth German Gewerkschaft (German Socialist Trade Union) congress, which met this week in Stuttgart, for several reasons is of interest. In the first place, for the first time in the history of Germany the German Government sent representatives to attend a Socialist labor congress. Legien, the able manager of the Gewerkschaften, in his greeting to the Government officials, said that they would realize that they were as well off at a labor congress as at a meeting of employers. He was glad that the Government had come so far as to extend recognition to the representatives of organized labor. It also deserves to be noted that, for the first time, English trade unionists were in attendance at a German trade-union congress, James O'Grady and Peter Curran having come from London to Germany for this purpose. The business report submitted to this year's meeting is also worthy of note, for it shows that the Gewerkschaften, in spite of the very serious economic conditions prevailing in Germany, have grown — in fact, since 1892 have tripled their membership, now having 481,798 members. The organizations last year had a total income of 294,189 marks, while their expenditures were 208,344 marks, exclusive of strike-funds, which amounted to 241,450 marks raised by special collection. The Gewerkschaften of Germany have had a slow, but sure, growth. While Lassalle and other early Socialist leaders were opposed to the trade-union idea, it is now admitted by the German Socialist party that trade unions are of great benefit to the laboring people. Strange to say, however, while Germany has over 6,000,000 workmen, only 700,000 belong to trade unions. This condition, therefore, was due to the fact that up to a recent date the coalition of workingmen was prohibited by the State, so that trade unionism had but little chance to develop. Since the Government has become more liberal trade unions have grown. — *Boston Herald.*

CONDITION OF NEW YORK UNION MEN IN 1902. — John McMackin, New York State Commissioner of Labor, has issued the following review of the conditions of labor in this State in the first quarter of 1902: The amount of idleness among the members of New York labor organizations was far smaller than it has been in the months of January, February and March in any recent year. Heretofore at least 10 per cent of trade unionists have been idle during those months, but this year the proportion has fallen to 6.2 per cent. The average number of days worked by the men increased from 58 in 1897 to a little less than 67 in 1901, and 67.3 in 1902. Average earnings of organized workingmen increased in about the same ratio, having been $155 in the first quarter of 1897, a little less than $183 in 1901, and a little over $184 in 1902. Building-operations in the first three months of the year, before the interruption occasioned by the usual spring disputes, were very active in all the large cities. The number of labor organizations in this State at the end of March was 1,930, which is an increase of 59 over the number existing last September. The number of new unions recorded was 152; of old unions dissolved, 93. The aggregate membership is now 279,930, an increase since September of only 3,809. The number of immigrants at the port of New York in January, February and March, 1902, was 104,937, which was 35,134 more than a year ago, and 76,829 more than in 1895. The Bureau of Mediation and Arbitration recorded 22 industrial disputes in the first quarter of this year, involving 75 firms of associations of employers. The number of employers directly affected by these disputes was 1,788, and the number indirectly affected, 744, while the duration of the disputes in working-days (time lost by the 2,532 workpeople) was 84,425. Four of the disputes that ended in the period began in 1901, while two of the eighteen disputes that began in the quarter are still unsettled. More than one-half the disputes turned upon the question of wages.

ARE THE PROFESSIONS COMMERCIALIZED? — The truth is, we hear too much about the commercialization of the professions. There are men who vulgarize them all — no doubt — and who sell their craft-right for a mess of millions, for there have always been such men. But there is another tendency of our time that is far stronger than the tendency to get wealth: it is the tendency to establish, to build, and to maintain institutions of any useful and honorable kind. Men give themselves in the most unselfish way to build up colleges and universities, hospitals, museums, clubs, associations, for the advancement of trades and professions, libraries — there is no end of the list. Men labor to turn their business into institutions. Many founders of great commercial houses work for their honorable perpetuity. Many manufacturers plan their factories so as to give them an institutional character and value. The naturally constructive tendency of an active people is towards institution-building. Strong men in almost every department of work show such a tendency, often as a dominant trait of character; and this is a stronger motive than the mere wish to be rich. The rich man who stands alone, who has not established something, who is not identified with some great institution, commercial or public, is not envied. He is more likely to be pitied. — *The World's Work.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, JULY 19, 1902 No. 1386

CONTENTS.

SUMMARY: —
The Fall of the Tower of St. Mark, Venice. — Instruction in Engineering at the Massachusetts Institute of Technology. — The Corrosion of Metals encased in Masonry. — Opposition of some Workingmen to additional Holidays. — Death of Prof. John D. Runkle. — The Conversion of Cambridge Marshes into Parks. — Smoke Consumption in Paris. — Excavations on the Site of Larissa of Antiquity. 17
NOTES ON IRON AND STEEL CONSTRUCTION. — IX. 19
LIBRARIES IN THE UNITED STATES. — I. 21
ILLUSTRATIONS: —
The Board of Trade Building, State and Broad Sts., Boston, Mass. — A Competitive Design for the Carnegie Library, Burlington, Vt. — United States Post-office, Lockport, N. Y. — Interior Detail: Majestic Theatre, Boston, Mass.
South Porch: Sta. Maria Maggiore, Bergamo, Italy.
Additional: The Small Quad: University of Pennsylvania Dormitories, Philadelphia, Pa. — House of Wm. A. Gaston, Esq., Bay State Road, Boston, Mass. — The New Board of Trade Building and its Neighbors, Boston, Mass. — Churches at Röttingen and Thannhausen, Würtemberg. 23
COMMUNICATION: —
The Colt Memorial Buildings, Hartford. 23
NOTES AND CLIPPINGS. 24

ONE of the most extraordinary accidents of recent years is the fall of the Campanile in Venice. This famous structure, more than three hundred feet high, the foundations of which were laid more than eleven hundred years ago, and which was completed in its present form nearly five hundred years ago, collapsed, almost without warning, in the middle of the forenoon of July 14, falling in a heap of ruins, but fortunately, without seriously damaging the splendid and famous buildings which surround it. According to the newspapers, the first indication of any movement in the tower was observed on the day previous to the catastrophe, when a crack was seen near the corner of the north wall, and two of the windows were found broken. The Government officials, who keep a close watch upon ancient buildings in Venice, at once arranged for examination and repairs; and, as a measure of precaution, the usual Sunday afternoon concert in the Piazza of St. Mark, under the shadow of the tower, was abandoned. If it had not been for this prudent proceeding, the loss of life might have been appalling; but the fall, which might very probably have been hastened by the movement of a crowd around it, was delayed until a time in the morning when the Piazza is comparatively unfrequented; so that there is reason to hope that the loss of life was inconsiderable.

THE Trustees of the Massachusetts Institute of Technology have decided to establish a course, very much in accordance with the plan suggested by Mr. Edward Atkinson, for the instruction of young men "in the selection and constructive use of materials with a view to minimizing the risk of destruction by fire." Our valued contemporary *Insurance Engineering* thinks that architects are remarkable for "an ungraceful verbosity," and a "characteristic loquacity," so that we hesitate to make any comments on this subject, but it might be remarked that, with the very best wishes for the success of the new course, and the highest opinion of its value to the community, we hope that the underwriters will not forget that it is to them that the graduates in the new course must look for employment after their graduation. Although, as *Insurance Engineering* informs us, "underwriters cannot afford to waste valuable time on architects," the latter have been able to learn, partly from the officials of the factory mutual companies, for whose work they have the highest respect and admiration, and partly from their own observation, at least as much of the science of fire-resisting construction as they find to be called for by their clients, and, while the graduates in the new course can be of great use to the public as inspectors, either for insurance-companies or official departments, they are not likely, we fear, to find their services in demand elsewhere.

AT the risk of giving further evidence of the "excessive volubility" which, as *Insurance Engineering* informs us, is one of the more conspicuous failings of architects, we will venture to suggest, in reply to Mr. Edward Atkinson's observation that opportunities for studying the effect of atmospheric corrosion on iron cased with masonry are difficult to obtain, that, in default of such opportunities, it is possible that valuable indications might be derived from investigating the action of hydrochloric-acid vapor upon cast-iron and steel protected by such a casing. The action of hydrochloric acid would be far more rapid than that of the carbonic or sulphurous acids of the atmosphere, but it would be affected, in something the same manner as the latter, by the action of the lime and cement in the masonry in intercepting and combining with the acid before it could reach the metal. In this way the advantage, or the reverse, of painting the iron, and the effect of leaving voids between the iron and the masonry, in place of grouting everything closely, could, at least, be studied by analogy, while waiting for a chance to make more decisive tests. We may say that, judging from our own observation, the theory that iron or steel embedded in masonry cannot rust needs to be accepted with reservations. It is well known that iron ties have been taken from buildings in Europe, after having been buried in masonry for seven hundred years, without a sign of corrosion, but there are also instances of the corrosion of iron similarly situated after the lapse of a few years. We have in mind a building, plastered outside with lime and cement on wire-lathing eight or ten years ago, the plaster on certain portions of which is already slightly, but uniformly, stained with the brown color of oxide of iron. The wire has never been exposed, on the front, to the direct influence of the weather, but it is possible that the back may not have been completely buried in the mortar; and it would be interesting to know whether the influence of the atmosphere, penetrating through the layer of mortar into the crevices behind it, has affected the wire, or whether there is something in or about the wire itself that has disposed it to rust, notwithstanding its alkaline covering, or whether the effect is due to some other cause.

A RATHER significant discussion took place not long ago at a meeting of a labor union connected with the Boston Navy Yard. There had been some talk of establishing a large number of holidays, about fifteen, for the special benefit of Government employés, and some of the speakers desired that the meeting should express its opinion in favor of the idea. To the astonishment and grief of the professional labor agitators, one of the union members rose to oppose any such action, on the ground that it was of no particular advantage to a workingman to have fifteen additional days to spend in idleness; and that, if the Navy Yard employés worked fewer days in the year than the men in outside shipbuilding establishments, the labor cost of the work that they did would be correspondingly increased, and the difference would tend to throw the building of ships of war into the hands of outside contractors, thereby depriving the Government mechanics of the work. This view, which certainly seems reasonable, was supported by a large number of men, in spite of the sneers of the "friends of labor," who fiercely denounced any man who could be so false to "union principles" as to refuse a chance to get paid for a day's work without doing anything. On the whole, the advocates of honest and faithful industry, even among workingmen, seem to have had the best of the argument, and their example should encourage other workingmen in rebellion against the "union principles" which threaten, in time, to destroy our industries as they have already dragged down those of Great Britain. It is interesting to note, in connection with this discussion among the Navy Yard workmen in Boston, that the construction of a large naval vessel which it was intended to carry out in Boston, has been, since the meeting, definitely assigned to another Navy Yard, in consequence, it is said, of the smaller expense of construction at the latter. Whether the difference in cost of construction was a matter of actual calculation, or whether it was inferred as probable, from the disposition shown by the union leaders, does not appear; but it is certain that people who publicly advocate measures for enabling workingmen to take the money of their employers without rendering any equivalent are, to say the least, very doubtful friends of labor.

PROFESSOR JOHN D. RUNKLE, long at the head of the department of mathematics in the Massachusetts Institute of Technology, and for some years President of the Institute, died a few days ago, at the age of seventy-eight.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

Professor Runkle was a country boy, having been born and brought up in a village in New York State; but his capacity and energy made up for the disadvantages of distance from schools; and, although he was twenty-five years old when he finally secured his matriculation in the Lawrence Scientific School of Harvard University, he graduated three years later with both the Bachelor's and Master's degrees, and with a reputation as a mathematician which extended far beyond the University precincts. He was immediately engaged as one of the staff of the *Nautical Almanac*, and held this position for more than thirty years. While occupied in this work, he found time to edit the *Mathematical Monthly*, of which he was one of the originators, and his conduct of this brilliant scientific periodical added to his reputation. On the establishment of the Institute of Technology, in which he took an important part, he became a member of the faculty, and, with the exception of a few years absence abroad, his connection with the Institute was never afterwards interrupted. Personally, Professor Runkle was one of the most charming of men. He was universally beloved, by his pupils as well as by his associates, among whom he was conspicuous for his unwearied zeal in behalf of the Institute, and his wisdom and farsightedness in devising plans for making it more useful to the community.

THE improvements which are being made on the banks of the Charles River seem likely to effect, before many years, a great change in the distribution of the residence and business quarters of what is already virtually the central portion of the Boston metropolitan district. From what was locally known, in our college days, as the "ma'sh," a dismal bog, overflowed in high tides, which separated the river channel from the habitable portions of Cambridge, has been formed a beautiful park, extending along the shore, with varying width, for about ten miles. This parkway, or "Esplanade," as it is popularly called, facing south, and looking across the river to the city, closely resembles the "*quais*" of the new part of Geneva, and, like these *quais*, is sure, before long, to be lined with beautiful houses, hotels and club-houses, intimately connected by the West Boston, Harvard and Cottage Farm bridges with the business and residence sections of Boston, yet enjoying, like the palaces on the Geneva *quais*, the air and sunshine which are hardly to be had in the city. The Charles River Parkway has, however, the advantage over its Swiss prototype of being many times as long, so that it will afford, when complete, one of the most attractive of the magnificent drives characteristic of the park system of metropolitan Boston. At one point, the Esplanade parkway approaches very closely the main entrance to the grounds of Harvard University, and it is proposed by friends of the University to connect its enclosure with the Esplanade by a short, but wide, street, planted with trees, thus giving to the college grounds, what they have never had, an approach worthy of the beauty and interest centred in them. At present, the University precincts are reached mainly by Massachusetts Avenue, a street rather too narrow for the traffic through it, and encumbered with strings of electric-cars. Driving through Massachusetts Avenue is both disagreeable and dangerous; and the provision of a splendid parkway, short, and nearly straight, from the college enclosure, by way of the Esplanade and Cottage Farm bridge, to Commonwealth Avenue and the most fashionable residence quarter of Boston, would soon throw over the new route a large part of the traffic.

THE question of smoke-consumption has long agitated the city of Paris as well as cities in our own country; and although it is forbidden to discharge smoke into the Parisian atmosphere, just as it is into those of New York and Boston, the means for avoiding it is no better understood there than here. In 1894, a grand competition was held by the city of Paris for smoke-consuming apparatus. One hundred and ten devices were exhibited, of which not one was held by the judges to be satisfactory, and only six were awarded even a premium. Since then, very little progress has been made, and it seems to be an official, rather than a patentee, who has, so far, come nearest to success. This official, M. Sabourain, Inspector of the pneumatic-tube service of the Paris post-office, having several boilers under his charge, was led to study the possibility of diminishing, by some simple means, the discharge of smoke from their chimneys, a discharge which not only contravened the police-laws, but, to a certain extent, wasted coal. As every one knows, the principle of all smoke-consuming devices for boiler furnaces is to force the smoke from the fresh coal to pass through a mass of coal already brightly burning, so that the carbon of the smoke may be caught and consumed. Although the principle is simple, the practice is by no means equally so, for the carbon-bearing smoke, as it passes through the second fire, must find there oxygen with which to combine, and the problem of supplying oxygen both to the second fire and the smoke has been found a difficult one.

TO meet the case as directly as possible, M. Sabourain, taking, for example, the fire-box of a water-tube boiler, of the Babcock and Wilcox or Worthington type, inserts a fire-brick arch over the front half of the grate, above the fire-door, but curving downwards at the back, toward the grate; and, at the same time, an iron plate is hung in the ashpit, below the middle of the grate. When the fire is lighted, a quantity of coal is placed on the front of the grate, and, when thoroughly incandescent, the mass is pushed to the rear. The next charge of coal is put on the front of the grate, and the smoke which at first rises from it is directed by the firebrick arch down to, and over, the brightly burning coal beyond. At the same time, the plate, hanging loosely in the ashpit, cuts off some of the air from the rear portion of the fire, while it increases the proportion of oxygen which passes through the front part, and which the smoke carries with it to the rear, where the heat is sufficient to determine combination. This simple arrangement seems to have proved very successful. Although the firebrick arch, of course, cuts off the front part of the water-tubes from the direct action of the fire, the loss in evaporating power due to this is said to be fully made up by the more perfect combustion of the fuel, while the arch, by protecting the front ends of the tubes, and their connections, from violent fluctuations of heat, and from the currents of cold air which enter when the fire-doors are opened, favors constancy of pressure, and preserves the tubes and joints. On the first installation of the apparatus in a battery of boilers in the Avenue Bréteuil, while the smoke was practically suppressed, it was found that more coal was used, by about five per cent, than was burned without it. This difference was, however, discovered to be due to the loss of small particles of coal through the grate in shifting the charges from the front to the back of the fire; and, as *Le Génie Civil* tells us, it was substantially overcome by changing the grates, and putting in those of the Wagner pattern, the bars of which are only one-quarter of an inch apart.

EXCAVATIONS made on the site of the ancient Larissa, on the slopes of Mount Hermus, in Æolis, have brought to light some curious remains of Greek antiquity. The name of Larissa is common to many places in Asia, the Grecian mainland and Italy, and is believed to have been simply a word signifying a walled city in some language spoken long before the Aryan immigration. However that may be, the various Larissas are places of great antiquity, and some of them promise discoveries, perhaps rivalling in interest those made in Argolis and Crete. The Æolian Larissa, being favorably situated for settlement, according to ancient ideas, has been continuously inhabited for many centuries, with the result that each generation has done its best to pull down and remodel what the previous one left to it, and the relics of distant antiquity must be sought in the rubbish heaps of a less remote civilization. Investigation has, however, shown that the town, in the Hellenic period, was surrounded by strong walls, very probably left, like those existing at Chiusi and other Etruscan cities in Italy, by a race of which almost nothing is now known. Within the walls were spacious houses, with courtyards, and a temple built of terra-cotta, richly painted, apparently after the manner of the Asiatics. At the time of the Hellenic ascendancy, the inhabitants of the town, whether Hellenic colonists or indigenous to the soil, seem to have been taken with a fever of reconstruction, and the terra-cotta temple was pulled down, and the fragments broken up into small lumps, which were used to level up the streets; and by digging up the ancient streets small pieces of the terra-cotta have been recovered. Either at this time or earlier, two cisterns, each about twenty feet deep, were excavated in the rock within the fortifications to afford a reserve of water in case of siege. In demolishing the old terra-cotta temple the capitals of two columns, which afforded two large and heavy blocks, were reserved, and put as covers over the mouths of the cisterns, and here they have remained for something like twenty-five hundred years, until dug out for the enlightenment of hyperborean savages. The form of these capitals is very curious, and the comparison of their details with those of other prehistoric sculpture should cast some light on the early history of the region.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — IX.

NO other part of the structure of a modern building of the skeleton-construction type requires the exercise of so much care and study as the character and design of the foundations. The foundations cannot be designed or proportioned with that niceness that is requisite until the building has been partially designed, for upon the design of the building depend the dead loads which enter largely into the determination of the dimensions of the foundations and the footings. The foundations should be properly proportioned so that they will sustain with safety, and with a minimum, or at least uniform, settlement, the maximum load to which they are subjected. The loads upon the foundations consist of the dead and live loads, subject to exceptions and considerations as subsequently stated. The accumulated dead and live load should be considered, and the area of the footings or foundation-piers proportioned so that the greatest pressure per square foot of soil does not exceed the several values given for the various soils in the following table: —

Material.	Safe bearing-value in tons per square foot.
Compact bed-rock of granite	30
Compact bed-rock of limestone	25
Compact bed-rock of sandstone	18
Soft friable rock	5 to 10
Clay in thick beds absolutely dry	4
Clay in thick beds moderately dry	2
Soft clay	1
Dry, coarse gravel well packed and confined	6 to 8
Compact sand well cemented and confined	4
Clean dry sand in natural beds and confined	2 to 4
Good solid dry natural earth	4 to 6

Where there is liability of the foundation-soil being loosened by water, or by adjacent building-operations, due precautions must be taken to prevent serious results from attending such contingencies. Poor soils should, wherever practicable, be improved so that they are better adapted for the foundations. If the soil is wet, or saturated, an effort should be made to improve it by drainage; loose soils should be rammed or otherwise compacted, and piles driven at intervals to accomplish such results where required. All foundations should be protected against frost, which must be accomplished by excavating for the foundation at least 6 feet below the surface of the surrounding soil. Since foundations upon yielding material will settle, more or less, care must be exercised to see that this settlement be uniform, and in order to obtain uniform settlement the pressure on a unit of area must be the same in all foundations, footings and piers, providing the nature of the soil is the same throughout the area of the buildings. If the soil under different portions of the building is likely to have different values, it should be carefully tested and the several bearing-values ascertained at several points throughout the foundation-area, and the foundation-footings and pier-foundations so proportioned that the settlement be as uniform as possible. In testing foundation-soils it is usually necessary to make borings, in order to determine the different strata of earth that underlie the site, for only in this way can it be ascertained whether a seemingly secure foundation-soil is underlaid with quicksand; for if this is the case the designer usually endeavors to so arrange the footings that the stable strata will not be penetrated, and its bearing-value, consequently, partially, if not entirely, destroyed. One of the safest methods of testing is by building a test-pier, and loading it from time to time, ascertaining the settlement that takes place day by day. Instead of the test-pier sometimes a heavy square timber is used, which is provided at the top with a platform; this timber is set upon the soil on end, and, being properly guided, is loaded with some heavy material, such as pig-iron, the load being increased gradually, and the settlements that occur carefully observed. A square timber or a pier loaded in this manner does not give accurate results because it has four cutting-edges in a very small area, while the usual footing has but two cutting-edges, and a pier-footing, while having four cutting-edges, covers an area great in comparison. The results obtained, however, are on the side of safety.

Where the actual live load is variable, and seldom approaches the load originally assumed, as in office-buildings, equal settlement of the foundations must be obtained by proportioning the areas of the footings so that the dead loads produce equal pressure. For example, the heaviest loaded foundation-pier in a building supports a dead load of 200 tons, and a live load also of 200 tons, while another foundation supports a dead load of 150 tons, and a live load of 100 tons. The first pier sustains a total load of 400 tons, and assuming the soil to safely sustain a load of 4 tons per square foot of pier-area, the area of footing required for the heaviest pier to carry both the dead and live load equals 400 divided by 4, or 100 square feet. This area gives, when estimating on the dead load alone, a bearing-pressure of 2 tons per square foot. Using this unit bearing-value of 2 tons for the second pier, the area of base required, figured on the dead load alone would be 75 square feet, while if both the dead and live loads were considered in proportioning the foundation, the required bearing-area would have been 62.5 square feet, and the dead load would cause a pressure upon the soil under the second pier of only 1.6 tons, which would have a tendency to cause unequal settlement.

All foundation-piers resting upon soils of good dry natural earth, and having a safe bearing-value of from 3 to 4 tons per square foot, should be designed as shown in detail in the Figure 65. In this typical foundation-pier the concrete base should be composed of 1 part cement, 2 parts sand and 5 parts broken stone, the stones being small enough to pass through a 2-inch diameter ring; this concrete base should have such an area that the pressure per square foot upon the soil does not exceed its safe unit bearing-value. The offset of the concrete, as at *a*, should not be more than one-half the thickness of the concrete, while the thickness of the concrete marked *b* in the figure should not be less than 12 inches, and is not usually more than 18 inches. The body of the pier is best built of good

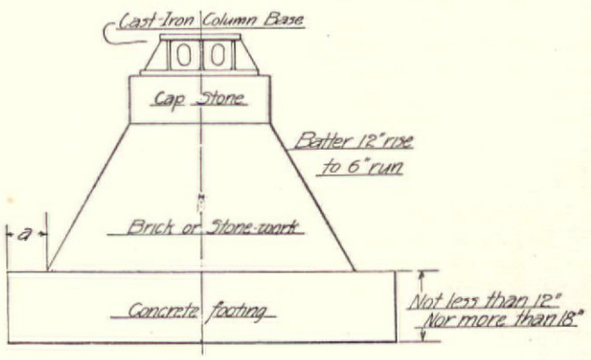


Fig. 65.

quality hard-burned, well-formed bricks, laid in Portland-cement mortar, and the area of the brick base should be so proportioned that the pressure upon each square inch of the concrete does not exceed 200 pounds; the batter upon which the sides of the brick pier is formed should not exceed a 6-inch offset to a 12-inch rise — that is, the rise should be in the ratio to the offset as 2 to 1, the sloping sides of the pier making approximately an angle of 60 degrees with the horizontal.

The area of the capstone upon the top of the brickwork should be such that the safe bearing-value of the brickwork is not exceeded, this value for brickwork in Portland-cement being usually assumed at 200 pounds per square inch. Should the load upon the stone cap be great, it is customary to use a heavy cast-iron pedestal, in order to distribute the pressure equally over the capstone. The area of the cast-iron base bearing upon the capstone should be such that the allowable crushing strength of the stone is not exceeded. The maximum working-pressure usually assumed for the materials employed in the construction of foundation-piers of the character just described and illustrated in Figure 65 is as follows: —

Granite	350 pounds per square inch.
Limestone	300 pounds per square inch.
Sandstone	250 pounds per square inch.
Brickwork in Portland-cement	200 pounds per square inch.
Concrete	200 pounds per square inch.

The capstones upon the top of such piers are usually of granite, limestone, or sandstone, and their minimum thickness is 12 inches, though their thickness in any case should never be less than one-fifth the greatest dimension if rectangular, and one-fourth the length of its side if square. The cast-iron pedestal upon the top of the capstone should be designed as described in a previous article. The following is an example of the application of the foregoing: —

[1] Continued from No. 1383, page 103.

Example. — It is required to design a square foundation-pier of hard-burned bricks, with concrete footing of Portland-cement mortar. The capstone is of granite, and supports a cast-iron pedestal, which in turn sustains a structural-steel plate and angle column. The load upon the column is 600,000 pounds, and the safe bearing-value of the soil has been ascertained to equal 3½ tons per square foot.

Solution. — The size of the cast-iron pedestal is dependent upon the unit allowable bearing-value of the capstone, taken from the preceding table as 350 pounds per square inch; then 600,000 pounds ÷ 350 = 1,714 square inches required, and the dimensions of the base will equal $\sqrt{1,714}$, or, approximately, 42 inches on a side. The size of the granite capstone will be determined by limiting its pressure on the brickwork to 200 pounds per square inch, and the area required on the bed of the stone will equal 600,000 ÷ 200 = 3,000 square inches, the length of its sides being $\sqrt{3,000}$, or 55 inches; its thickness will be one-fourth of its base, or 14 inches. The area required for the concrete-footing is equal to 600,000 ÷ 7,000, or 86 square feet, and, consequently, it should be 9 feet 3 inches square, its thickness being 18 inches. Since the sides of the brickwork are battered 1 to 2, and the dimensions of its top and bottom are known, its height will be found as follows: —

One-half difference between top and bottom dimensions = $\frac{(111-18)-55}{2} = 19$ inches; the 18 in the calculation is twice the offset of the concrete beyond the brickwork, which, as previously stated, should not be less than one-half the thickness of the concrete; it is, in this case, 9 inches. The batter being 1 to 2, the height of the brickwork should equal 19 × 2 = 38 inches. From these calculations the foundation pier, cap and pedestal, and the foot of the column can be designed as shown in Figure 66.

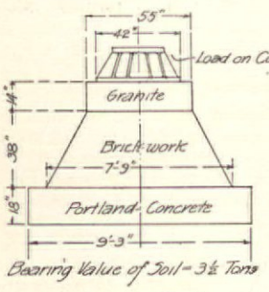


Fig. 66.

Where the weight of the building upon the foundations is great, and the soil offers insufficient bearing-capacity, pile foundations are usually resorted to; they are principally used, however, where the soil is of a clayey nature, underlaid with hard-pan or bed-rock. In such instances piles are driven to bed-rock, or to the hard-pan. Piles are of several kinds, and may be classed according to the material used, for they may be of timber, cast-iron or steel, and in some instances of steel castings filled with concrete. They may likewise be classed under two headings, determined by the processes by which they are placed. For instance, they may be driven by blows struck with a heavy weight falling some distance along vertical guides, or by a hammer worked by steam or gunpowder. Piles may be screwed into the ground, in which case they are provided usually with a cast-iron screw, having one turn, secured to the lower end, and the pile is made to penetrate the soil by turning. Piles are sometimes inserted in sand by the erosive action of a jet of water. In such instances a pipe is secured to their lower end, through which is forced a jet of water under pressure, which washes away the material beneath the end of the pile, the pile settling into the hole made in this manner, by its own weight. The piles used in building-construction are principally of timber, though where the new foundations are adjacent to others sustaining heavy loads, and where the soil is particularly susceptible to disturbance by jarring or vibration, screw piles are often resorted to.

Timber piles, if properly driven, and their location allows them to be submerged in water, are considered by conservative engineers as very satisfactory and permanent foundations. Foundation piles should not be spaced closer together than 2 feet from centre to centre, nor farther apart than 3 feet. Where their length is under 20 feet, they may be 10 inches in diameter at the large end, and 5 inches at the smaller, but where their length exceeds this dimension, they should be at least 15 inches in diameter at the large end, and not less than 10 inches at the smaller. All piles should be driven in a single foundation to an equal bearing, which should be determined by the distance the piles penetrate under the last blow of the hammer — that is, where they are not driven to bed-rock. The bearing-load on piles driven to bed-rock through stiff soil, capable of providing lateral support, should not exceed the safe direct compressive-strength of the timber taken at the least cross-section.

If the surrounding soil is plastic and incapable of furnishing lateral support, then the pile must be considered as a timber column, having the same length as the pile; its safe strength per square inch of mean cross-section shall then be determined by the following formula: —

$$W = S - \left(\frac{S\,L}{8.33\,D}\right)$$

in which formula W equals the safe load in pounds per square inch of section upon the pile; S, the allowable compressive-strength of the timber in pounds per square inch; L, the length of the pile in feet, and D, the mean diameter of the pile in inches. In this formula the allowable compressive values of the several kinds of timbers used as piles is as follows: —

White oak	800 pounds.
Southern long leaf, or Georgia yellow pine	700 pounds.
Cypress	800 pounds.
Chestnut	1,000 pounds.
Cedar	800 pounds.
Norway pine	800 pounds.
Oregon pine	1,200 pounds.

In locations where the bed-rock or hard-pan can not be reached, and the piles are driven through yielding material, their bearing-value may be ascertained by the following formula, which is known as the *Engineering News* formula, as it first appeared in that paper. In this formula the bearing-value, or

$$L = \frac{2\,W\,H}{p+1}$$

wherein W is the weight of the hammer in tons; H the drop of the hammer in feet, while p is the distance in inches penetrated by the pile under the last blow of the hammer. The penetration of the pile under the last blow of the hammer should, in applying this formula, only be considered when the burred splinters caused by the crushing at the top of the pile by the hammer have been removed.

There are many formulas for ascertaining the bearing-value of piles. Their results vary greatly, and many of them are not substantiated in practice. The following table is a statement of several of the principal formulas, though the one given above agrees more nearly than most of them with actual tests made upon piles, except possibly the one evolved from experiments by Hertiz: —

THE SEVERAL EMPIRICAL FORMULAS FOR DETERMINING THE BEARING-VALUE OF TIMBER PILES (DRIVEN BY HAMMER).

Authority.	Formulas.
Trautwine	$W = \frac{52\,P^2\sqrt{H}}{1+12p}$
Baker	$W = 100\,(\sqrt{P\,H} + (50\,p)^2 - 50\,p)$
Sander	$W_1 = \frac{P\,H}{8\,p}$
Hertiz	$W = \sqrt{500\,P\,H + (250\,p)^2} - 250\,p$

In these formulas W_1 = the safe bearing-value of the pile; W = ultimate bearing-value of the pile (both in tons); P = the weight of the hammer in tons; H = the drop of the hammer in feet; p = the penetration of the pile in feet under the last blow.

In driving piles for the foundation of important buildings test-piles should always be driven, so that their bearing-value can be approximately ascertained, and the results obtained by the formula to some extent checked. No fixed factor-of-safety can be employed for pile foundations, but in practice the factor-of-safety for driven piles ranges from 2 to 10.

If a pile depends for its bearing upon fractional resistance, it is probable that its strength will increase after driving, while, if it depends for its bearing-strength upon the bearing at its end, it will usually support a greater statical load than the load implied from the impact of the hammer in driving. After the piles are driven they are sawed off to a level, and may be capped either with granite blocks, concrete or timber grillage. When the capping is of timber or stone, then care must be exercised that the tops of the piles will all be cut off squarely and at one level, though where the piles are capped with concrete,

this consideration is not of so much importance. When piles are capped with a wood grillage, the grillage consists of heavy timbers about one foot square, made in the form of a stout frame, which is drift-bolted or pinned to the tops of the piles, the timbers in the grillage being likewise held together by drift-bolts. Upon the top of the grillage is placed heavy planking, upon which the masonry is started. The drift-bolt used in this construction is usually about 1 inch in diameter, and is driven into a ¾-inch auger hole; if the drift-bolt consists of a square bar 1 inch on a side, it is driven into a ⅞-inch hole. The timbers, in the top course, or layer, of the grillage, which support the planking upon which this masonry is started, are usually laid close together. Timber-grillage capping for piles should never be used unless it is entirely submerged. Concrete capping for pile foundations is, undoubtedly, the best construction for tall buildings. Where the masonry for the foundations is supported upon planking carried on timber grillage there is a danger of its slipping off, or sliding, and while this can be obviated by stepping the top of the grillage or by having drift-bolts project through the timbers and into the masonry, no such danger can possibly occur with a concrete capping, for the concrete is tamped in, around, and over the tops of the piles, as shown in Figure 67, and besides affording a durable footing which need not necessarily be under water, it has increased bearing-value, for to the resistance of the piles is added the bearing-value of the soil around them, upon which the concrete rests. In constructing pile foundations great care should be exercised to prevent disturbing adjacent buildings. If it is found necessary to drive them close to existing foundations, especially if such foundations support heavy buildings, and the surrounding earth is liable to considerable compression due to the superimposed load, such construction should be abandoned, and the foundations designed in such a manner as to prevent the danger attending the disturbance of adjacent footings.

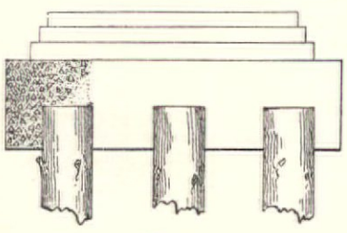


Fig. 67.

The next article will treat upon spread footings, a type of foundation that is particularly adaptable to high-building construction.

M. M. Sloan.

[To be continued.]

LIBRARIES IN THE UNITED STATES.[1]—I.

ALTHOUGH the library movement in America is by no means of recent growth, yet its developments during the last ten years have been so enormous that few buildings erected previous to 1885 would be found to-day suitable for modern requirements. The librarians themselves have settled points in the policy of the working of libraries which previously were undetermined, and it is the very active interest of these men which has so greatly assisted the architects to produce the very fine plans.

The remarkable generosity of Mr. Carnegie has helped forward the movement wonderfully. Last year alone he gave more than £2,500,000 for new buildings. The activity of other generous men and women has also been very great, as well as the public-spiritedness shown by many of the great towns in voting large sums of money for similar purposes. The result is that the American architect has an opportunity quite unequalled, and he decidedly is showing the greatest interest in the work. At present some of the recent plans seem as perfect as possible, yet the interest in the subject is so great and ideas in regard to the working of libraries are being so rapidly evolved that new developments are always taking place.

An endeavor has been made in this paper to select representative libraries in each class: many good ones, no doubt, have been missed — but during a short stay in so large a country that was inevitable — and many could have been included if space had allowed.

The descriptions of the various libraries have been grouped under the following heads (town libraries have been subdivided into three, according to the size of the library): (1) Reference libraries; (2) University libraries; (3) Town libraries (in three divisions); (4) Branch libraries; (5) Small libraries.

REFERENCE LIBRARIES.

It is difficult to distinguish between the very large town libraries, such as those of New York and Boston, and what might be called reference libraries proper. It is, of course, the lending-department which makes the distinction. Yet both the New York and Boston libraries will in the future become, as their collections increase, great reference libraries. These valuable collections will be studied on the spot, and it is from this point-of-view that the New York Public Library seems to have been planned. Its spacious reading-rooms, wonderful series of special libraries and exhibition galleries, are all designed for the student. Its description has therefore been included under this heading. The Congressional Library at Washington is decidedly the largest yet erected of this class. Its octagonal reading-room with the immense book-stacks projecting from three of its sides is the important feature, and it is interesting to compare it with the totally different method adopted at New York, where the main rectangular reading-room is placed over the seven floors of the stack-room. A similar plan to the latter has been suggested by the architects, Messrs. Shepley, Rutan and Coolidge, for the proposed John Crerar Reference Library at Chicago: here the reading-room, 240′ x 50′, is placed on the third floor, with four floors of stack below.

The Newbery Reference Library at Chicago can hardly be included as a recent one, yet it cannot be passed over without comment. It was the result of the ideas of the librarian, the late Dr. Poole. He held that a library should be really nothing more than a warehouse divided into rooms, in which the books were stored and read, and having no general reading-room or general stack-room, the books being shelved in the various rooms according to their subjects. The building has a frontage of 325 feet and a depth of 75 feet, and consists of basement and four floors. The plan is extremely economically arranged, and with the exception of the corridor at the back the whole of the floor-area is used for reading-rooms of various sizes, the end ones being each 50′ x 66′, the others between being smaller. Although Dr. Poole's plan was not wholly a success, yet its influence has been great, and the use of the special room with its special collection of books has become a law in library-planning.

Nearly all the States have reference libraries, but rarely have special buildings been erected. They are generally incorporated with, and form part of, the State House, as at Boston, Mass., and at Albany, N. Y. The recently erected one at Madison, Wis., is a distinct building, and is planned rather on the lines of a large town library. The main floor-plan is very well arranged.

THE CONGRESSIONAL LIBRARY, WASHINGTON.

The Library of Congress at Washington is by far the largest library-building[2] in the United States of America. It was in April, 1886, that Congress selected and acquired the site and proceeded to obtain plans. Finally, those prepared by Messrs. Smithmeyer and Pelz were adopted, but no limit of cost was fixed. By the summer of 1888 about one-half of the foundation-footings for the building were laid. During that year, however, Congress became dissatisfied with the progress that had been made, and lodged the entire control of the work, including the preparation of new plans, in the hands of General Casey, Chief of Engineers of the United States Army, with Mr. Bernard R. Green, C. E., as resident-engineer. In March, 1889, Congress enacted that the building should be erected at a total cost of £1,300,000, including previous expenditure, according to the plans prepared and submitted by General Casey, which were based on those adopted originally and provided a building of similar form, dimensions, and architecture. Under the new conditions operations were commenced in the spring of 1889 where they had been left off the year before, and the construction then proceeded without interruption until the building was finally completed in the spring of 1897.

The building is 470 feet in length by 340 feet in width, with four great inner courts. In height it consists of three floors above the ground; there is also a sub-basement. Each of the six pavilions contains an attic. The following is from Mr. Green's account of the building in the Smithsonian Report of 1898: "The first guiding principle of the design to accommodate a nation's library was that an ample general reading-room should be located within the mass of the books to ensure their easy reach and access. The next was ample light and air combined with security and latitude for future growth of the collections and their uses; then that all necessary accommodations should be provided for the constant work involved in the care, use, and increase of the library and its several departments. In endeavoring to meet all the utilitarian requirements of a national library in the present generation, it was found that library science was in a state of rapid evolution, and that the future of the subordinate departmental locations and needs was not sufficiently defined to enable special provisions to be made for them during the construction of the building. As a collection of books, however, to be housed in shelves and used by readers, the problem of shelving and reading-room was much more clearly presented, although book-shelving on a scale of millions of volumes had not hitherto approached a stage of perfection."

It was out of these conditions that the plan of the building was evolved. First, a reading-room of octagonal plan to accommodate 250 to 300 readers, amply lighted, is placed in the centre of the building. Adjoining this on three sides the great stacks of book-shelving are located, the main entrance to the room being on the fourth side. The four alternative octagonal sides face towards the large inner courts. The cross plan thus formed is enclosed by four fronts, the whole forming a rectangular plan and containing spaces for the subordinate departments of the library, for expansion of the stacks of book-shelving as future needs will require, and for the exhibition-halls, special reading-rooms, staff offices, etc. For the reason given the spaces in the front sections of the building were generally

[1] A paper by Sidney K. Greenslade [*A.*], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal* of the Society.

[2] See plan and interior views in the Paper on "Public Libraries," by the late Mr. J. M. Brydon, *Journal R. I. B. A.*, Vol. VI. (1898-99), pp. 214-15, 217.

not subdivided, but are so disposed as to admit of any desirable subdivision of a more or less permanent character that experience may dictate. At the same time the arrangements of windows, ventilation and communication, and the strength of the floors, are such that any part or the whole of any of the long halls may be conveniently occupied by shelved books, while the corner pavilion rooms are favorable for staff-work, reading-rooms, etc., and contain also lavatories and stairways.

The building has only two entrances — a two-storied one in front and a single one in the rear. The first is for the general use of the public and the other especially for the delivery and dispatch of freight. The front, or main, entrance opens into a great staircase-hall, 132 feet wide by 122 feet deep, extending the full height of the pavilion through the first and second stories. The great octagonal reading-room opens directly from the stair hall: it is 100 feet in diameter, 125 feet high to the crown of the dome, and is lighted by eight large semicircular clerestory windows, 32 feet wide, and the lantern above the dome. Small windows open into the alcoves in the four sides facing the courts. The seating capacity of the room is for 250. The space allowed each reader averages 4 feet of desk. The desks are arranged in concentric circles; there are three rows, the two outer rows have double desks, the readers facing each other. The double desks are 4 feet wide altogether, and are sloped 3 inches, the height being 2 feet 9 inches to the top; between them at the centre is a small screen 9 inches high. The space between the rows, centre to centre, is 11 feet 3 inches.

The card-catalogue and the superintendent's tribune and desks for his assistants are placed in an enclosed circular space, 29 feet in diameter, in the centre of the room. The floor of the superintendent's desk is raised 4 feet 8 inches above the floor of the reading-room and commands the greater portion of it. There is a small stairway of six steps up to it; balancing this stairway on the other side is one to the basement. At the back of the superintendent's desk is the cabinet containing the terminus of the system of book-carrying apparatus connecting the reading-room and stacks. The lift from the basement is also on this side of the enclosure. It is large enough to take the vertical book-trucks used in the room and stacks. This central desk is also in communication with the several stories of the book-stacks by means of pneumatic tubes for written messages and speaking. These are placed along the front of the superintendent's desk. There are twenty-four altogether — nine go to the north stack, nine to the south stack, and four to the east stack. Of the other two tubes, one goes to the librarian's room and the other connects with the Capitol. Each tube is numbered, and is worked by pressing a button, the action of which indicates also when the message is delivered at the other end. The height of the delivery-counter which surrounds this central enclosure is 4 feet 1 inch from the floor outside and 3 feet 4 inches from the raised floor inside. Its width is 2 feet 9 inches. The drawers for the card-catalogue for official use are placed on the inside towards the attendants. Outside the front is panelled only. The working-space for the attendants inside is 4 feet wide, and the space in front of the delivery-counter for the public is 7 feet wide. The card-catalogue for public use, book-shelves for dictionaries, encyclopædias, etc., with standing desks above as well as seats alongside, face towards this space.

The two tiers of alcoves on each of the eight sides of the rotunda call for special notice. Each bay, about 12 feet deep by 37 feet wide, is divided into three alcoves by book-stacks, and they are separated from the reading-room by bronze gates. These alcoves provide specially good places for quiet study. Above them is a gallery 35 feet above the floor of the reading-room, from which visitors not desiring to read may view without disturbing the readers.

The three great book-stacks project from three out of the eight sides of the reading-room and extend to the wings of the building. These are certainly most interesting and remarkable. All three are the same width, 45 feet, and the same height, 63 feet, but the lengths differ considerably — the north and south being 112 feet, against 30 feet for the east stack. They are absolutely fireproof, the only materials used being steel, iron, brick, glass and marble. The stacks are divided into nine floors, each floor being 7 feet high. The basement story is 14 feet below the level of the reading-room floor.

The fitting of the stack-rooms is quite independent of the walls. It consists of a slender rolled-steel framework of continuous columns and horizontal deck-members. These horizontal bars have proper anchorage in the surrounding walls — requisite for the lateral stability of the loaded stack. The decks are covered with white-marble slabs and contain narrow openings in front of the shelf-ranges for communication, admission of light, and the circulation of air. Between the stanchions a simple vertical cast-iron wing is attached, having the necessary teeth and lugs to receive the shelves and permit of their ready adjustment to any interval desired.

The shelf is of a gridiron form, being a set of parallel-bars of ∩ section. Its length is 3 feet 8 inches, in all the stacks; they are therefore interchangeable, and may all be removed from any bay or series of bays on a floor to make a passage-way. They are constructed of bars of rolled steel treated by the Bower-Barff process with a coating of magnetic oxide, which renders them as smooth as glass, and they are so spaced as to afford ample ventilation for the books and prevent any accumulation of dust. The central marble gangway, running from end to end of each stack-room, is 6 feet wide. The stacks are placed at 5 feet 4 inches centres, the marble passage-ways between them being 2 feet 6 inches wide — the 5-inch air-spaces on either side making the total width 3 feet 4 inches.

Each of the two large stacks has a shelving capacity of 800,000 volumes. The ultimate shelving capacity of the whole building will admit of the storage of over four million volumes. An elevator, stairway, and the endless-chain book-carrier are located in the middle of the stack.

The book-carrier is a pair of parallel endless chains running in a vertical shaft in the middle of the stack, thence in a horizontal duct in the cellar to a point below the central desk of the reading-room, where it turns upwards and ascends vertically to the delivery-outlet at the desk. A series of equidistant book-trays, eighteen in number, are suspended between the chains. The machine runs continuously, and automatically takes on and delivers books of the size of a quarto or less at its reading-room terminal and at each of the stack-stories. The speed of the carrier is about 100 feet per minute.

At the ends of each of the passage-ways between the stacks are arranged the windows. They are placed at the intersections of the decks, so that each may diffuse direct light into two tiers at once. In this way both the upper and lower portions of the stacks are well lighted. The glass-line at the sill is 2 feet 7½ inches above the floor of the deck, and between each sill and head, and 1 foot 7½ inches above the floor is placed a seat to each window for the use of readers or the attendants. The windows are fixed and air-tight, all air for warming and ventilation being passed up through the stack from the sub-basement by natural draughts or fans and discharged at the roof. The fresh air is taken into the sub-basement through openings looking into the courtyards, first, however, passing through a filter of cotton cloth to exclude all dust; after being warmed it ascends. If necessary, electric fans are used in case of any sluggishness in the natural current of air. Besides windows in the side walls, there are skylights in the roofs to each of the stack-wings.

From a point in the basement just below the centre of the reading-room, books of any size are transported in a few minutes to the Capitol, and returned by means of an underground endless cable, driven by an electric motor. The distance between the Capitol and the library is a quarter of a mile. A brick tunnel, 6 feet high and 4 feet wide, connects the two, and through this the endless cable moves. The speed at which the cable runs is 600 feet per minute. The four outer wings with their corner pavilions surrounding the great reading-room and stacks are divided and allotted as follows: —

In the basement a corridor 10 feet wide is placed next the inner courts, with a staircase in each of the four corners to the upper floors and sub-basement, in addition to the two flights of stairs at the main entrance. The sub-basement contains the electric machinery, workshops, copyright storage, etc. The basement contains two large binderies, one 130′ x 22′ 10″, printing-rooms, copyright department, library for the blind, staff lavatories under the alcoves of the reading-room, the superintendent's department, public lavatories, mail and packing rooms.

The first story is occupied on the right of the main entrance to the front by the Representative's reading-room, 105′ x 22′ 6″, and the Senator's reading-room, 48′ x 30′. The south wing contains the reading-room for current periodicals and newspapers: it is 217′ x 35′, with the delivery-counter and the attendant's desk placed at the entrance to the south stack. The order and catalogue rooms are in the east wing, each 130′ x 35′. The north wing, as well as the north-west pavilion, is fitted for maps and charts: the former is 217′ x 35′, and is connected with the north stack. To the right of the main entrance are placed the administrative offices, including the rooms of the librarian. It is proposed at this first-story level to connect the north and south stacks with the catalogue and order rooms by bridges across the courts.

On the second floor the rooms are chiefly devoted to exhibition purposes — prints, books, manuscripts, special collections and music.

The height of the basement is 14 feet, floor to floor; the first story 21 feet, and the upper story is 29 feet in the clear. The boiler, battery, steam-pumps, coal-vaults, ash-house, etc., are located under the east approach outside the building. There are sixteen 60-horse-power boilers and a coal-storage capacity of 3,000 tons. The steam operates the hydraulic pumps for elevator power and water-supply, the air-compressor for the pneumatic-tube system, and the dynamo-engines for electric-lighting and power apparatus, the exhaust from which is passed through eight sets of tubular tanks for heating the water required for warming the building. By the circulation of this hot water through cast-iron coils of 3-inch pipe, enclosed in chambers of brick distributed throughout the cellar, to which it is carried and returned by pipes, fresh air from outside the building is warmed and passed by natural draught up wall-flues to the respective stories and apartments above. The air thus taken into the building and circulated through the rooms is discharged at the roof through other wall-flues.

The great reading-room, the fine stack-rooms, and the ample accommodation provided for the work of the library and its future needs make this one of the most important libraries in the world.

[To be continued.]

DALLIN'S "MEDICINE MAN." — Cyrus E. Dallin's "Medicine Man," the life-sized figure of an Indian in gala attire, which received prizes at the Paris Exposition of 1900 and at Buffalo last summer, has been bought by the Fairmount Park Association of Philadelphia, and will be cast in bronze. Austria also made an offer for the statue, and in recognition of the compliment Mr. Dallin has volunteered a bronze replica, if Vienna will pay the cost of the casting.— *N. Y. Evening Post*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE BOARD OF TRADE BUILDING, STATE AND BROAD STS., BOSTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

A COMPETITIVE DESIGN FOR THE CARNEGIE LIBRARY, BURLINGTON, VT. MR. WILLIAM SANGER, ARCHITECT, NEW YORK, N. Y.

UNITED STATES POST-OFFICE, LOCKPORT, N. Y. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

INTERIOR DETAIL: MAJESTIC THEATRE, BOSTON, MASS. MR. J. M. WOOD AND MR. J. G. HOWARD, ASSOCIATE ARCHITECTS, NEW YORK, N. Y.

[The following named illustration may be found by reference to our advertising pages.]

SOUTH PORCH: STA. MARIA MAGGIORE, BERGAMO, ITALY. DRAWN BY MR. W. CURTIS GREEN.

THIS plate is copied from the *Builder*.

[Additional illustrations in the International Edition.]

THE SMALL QUAD: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

HOUSE OF WM. A. GASTON, ESQ., BAY STATE ROAD, BOSTON, MASS. MESSRS. PETERS & RICE, ARCHITECTS, BOSTON, MASS.

THE NEW BOARD OF TRADE BUILDING AND ITS NEIGHBORS, BOSTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

CHURCHES AT RÖTTINGEN AND THANNHAUSEN, WÜRTEMBERG.

THIS plate is copied from *Zeitschrift für Bauwesen*.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE COLT MEMORIAL BUILDINGS, HARTFORD.

NEW YORK, N. Y.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Those of your readers who have had the pleasure of seeing, in Hartford, Conn., the church built by Mrs. Colt, in memory of her husband, and the adjoining parish-house, in memory of her son, have all doubtless carried away a general impression of artistic distinction. But, if asked for a specific characterization of that quality which to their apprehension dominates these works, or which, at all events, had most appealed to their sensitiveness, they would probably give quite different answers. What had most impressed myself, for instance, in the parish-house, was the notable result, perhaps unique in America, achieved by the architect's handling, in collocation with each other, of various species of stone, all contributing to an ensemble of color-harmony subdued in tint, as best befits most exterior building-surface, and highly effective and attractive to the artistic onlooker. One would, without surprise, find such an effect in some high-class textile fabric, but one would hardly expect it in a material so intractable as stone. Not, at all events, in this country of recent architectural creations, though in ancient edifices of the Old World, one occasionally meets similar examples, due partly to the genius of the designer, and partly to the blending touch of time, sun and weather.

I discovered, however, in confiding my impressions of this church and parish-house to their architect, Mr. Edward Tuckerman Potter, that, as regards the latter structure, he by no means acknowledged as its *piece de resistance* the color-scheme he had applied to its stone-work; with reference to both that and the church, his guiding principles, it seemed, had been based on quite another *motif*. As he proceeded to explain these, I found his remarks so interesting that it occurred to me they should not be confined to his listener of the moment, but would doubtless be equally appreciated by, and edifying for, a much wider audience. So, as our conversation on the subject approached its close, I asked him to give me, at his convenience, a memorandum of the chief points of what he had been telling me, which he did before long; and the more readily, perhaps, as the buildings in question had already been discussed in print in a manner meant to be, and which in fact is, largely appreciative, but to which their architect, at least on the point of "style," objected. Mr. Potter's observations, in treating of his methods, were, in substance, what appears in the earlier paragraphs and major portion of the following.

Yours truly, A. J. BLOOR.

In a work describing the Colt Memorial Buildings in Hartford, Conn., its author, after treating of one of them, the Church of the Good Shepherd, adds "in the same general style of architecture, that variety known as 'Early English.'" To this characterization the architect of the buildings, in his own copy of the volume, makes marginal reference in this note: "No, this is not an archaic reproduction, but live art; not 'Early English,' but the very latest development of Gothic treatment, and not more English than Lombardic."

In this architect's works the design is studied as from afar. The result is something to be looked at from a distance as well as at hand. The intention is to make it look, like some mountains, beautiful when seen from afar. The attainment of this end depends on the outline, and mainly the skyline, which, again, depends on the construction, or what can be erected on the plan, and so primarily on the plan.

When the plan alike suits both possibilities for good outline to be erected on it, and satisfactory provision for the uses indicated is secured, the great primal work of the designer — the design — is virtually complete. Next, it is important that as one approaches the building, it should continue to interest and please, as mountains do when we approach them and perceive how they are divided into ridges, ravines, etc. Next, when we are yet nearer, we want continued beauty; the fine trees, their foliage, their blossoms, even their last details may be compared with the details of a building, the *oggetti* — the objects — many of them more of a literary than of a strictly architectural character — that add interest to them, because, like types or subjects of carving, of their appropriateness to that particular building. These last naturally take and absorb the attention of the mass of visitors to a building, to the neglect of appreciation of its plan, its construction, its outline, its design. They interfere with a due conception of what has been involved in the sense of the drawing or form of its various parts, its elevations, exterior and interior, of the divisions of each, of the mastery in choice and selection, and of the art, the knowledge, the taste, the sensitiveness to effect embodied in all of these.

These general forms and details constitute what makes the character of the building — the style of its architecture; and the natural seeking of some word which will at once express this style, without the circumlocution of further description, without the trouble of analysis and study of that style, leads to words that misrepresent it. Gothic is a generic term, but the same so-called Gothic building has been sometimes classified, by persons who claimed to be fitted to instruct others, as Early English, Italian, Lombardic, and Victorian, when none of these words are really applicable in any justly descriptive sense.[1] True, what is built during the reign of Victoria is in that sense Victorian, but this applies to buildings widely different in style. The use of a color-scheme to add to the architectural effect of a building is quite usual in pseudo-Italian-Gothic, but color, *per se*, scarcely constitutes a style. The form of voussoirs of arches in which the extrados and intrados are not concentric is a feature of much Lombardo-Gothic work, but one such feature does not constitute, though it may be one mark of, a style. Narrow lancet-windows are common in Early English, but are not confined to the Early English style.

If we analyze the style of this architect's buildings we shall find that they always arise out of, and are governed by, the construction. The general forms are plain. The angles of jambs are generally chamfered. Mouldings are rarely used. The style might be described as "chamfered" to distinguish it from styles described or differentiated by the forms of their mouldings.[2] Stones of more than one color are used, and chiefly in the arches; the extrados and intrados of arches are rarely concentric. What governs the line of these arches it is difficult to determine. The joints that separate their voussoirs do not all radiate from the same point. We are led to the conviction from a study of these arches and their voussoirs that this fad gives them a peculiar variety. "The arch never sleeps," it is said; and not only is it so in these arches — as in all arches in fact — but there is something unsleeping, and so possibly morally uplifting, in their lines, something that stimulates in the sensitive nature a sort of

[1] From the strict constructional point-of-view it can hardly be admitted that there is any such style as Italian Gothic.

[2] Chamfering is largely used in the most ordinary wooden houses for the finish of piazza-posts, door and window trim, and at arrises generally. The word seems to have neither sufficient distinctiveness nor distinction to be fittingly applied, as descriptive of style, to structures of the rank of the Colt Memorial buildings.

emotion, a drawing in of the breath even.[1] A sensitive woman has testified that the sight of some of this architecture has each time moved her to tears. "I have that feeling that they call a frog in the throat," said another. "Many have said that they have that feeling here," was replied by one interested in the building. The treatment of even such a subordinate feature as a chimney may give such a sensation. Indeed it is common experience that all forms affect the sensitive nature through the eye, and not alone those finer ones appealing to us in pictures or in nature. We experience this in the reverse when we feel depressed by some low-browed or otherwise displeasing or prosaic or ugly buildings. In such a case we hear it said: "It oppresses me." "I could never live there." "I never want to see it again." "It is frightful to see." To analyze and find and select consciously what will produce such a semi-physical effect on the sensorium, and so give pleasure or pain by an architectural design, is art. To arrive at and effect such results without such analysis and conscious selection, but by merely unconscious feeling and choice, is genius.

Dismissing questions of *motif* and "style," Mr. Potter said further: "The burning in the great fire at Chicago of a church designed and built by myself led me to seek to make incombustible Gothic structures, when later called upon to design other churches. The first of these is the Church of the Holy Innocents, the Stevens Memorial Church, in Hoboken, N. J. Owing to the fact that no such building existed, I had to depend on the word of the constructor of the iron roof as to its qualities for the non-conducting of heat and cold; so I omitted making an air-chamber in the roof between the inside plastering and the outside slating; and the church has in consequence been very difficult to heat in winter and is, perhaps, very hot in summer. In the Colt Memorial Buildings this experience is profited by, and an air-chamber, of the thickness and depth of the rafters, being formed between the inside plastering and outside slating, no complaints of cold or heat have reached me."

Noticeable in the ironwork is the use of lattice-girders that have the effect of clerestories; and, by this means inside columns, to carry a wide and heavy roof, are avoided. The frankness of using the simple forms of these girders, and merely filling them with glass, is to be noted. It is by such expedients as these that the cost of the building is kept within bounds; a cost which would have been greatly surpassed by a Renaissance building of the same size and accommodations. The front elevation of the parish-house, with its staircases along the side, and the *ringhiera* in the centre, shows a novel combination, though a *ringhiera* on a public building is a not unusual Italian feature.

Had the piers of the balustrade crowning the arcade which is carried along above this staircase been finished with statues, as originally intended by the architect, the Italian character of the arcade would have been more marked.[2] The end elevations call for commendation as successful examples of rigorous symmetrical outline. This is best seen at some distance from them and exactly opposite their centres. The rear elevation, gaining a central feature from the tribune, which is such an important adjunct of the main room in the building, is in interesting contrast to the front elevation of the structure. The finish of the whole exterior mass, from groundline to delicate spirelet and from wherever seen, is noticeable.

If now we give consideration to divisions of the design, the interior façade which frames the tribune is especially noticeable. There is a sense of grandeur in this special rendering of the architect's concept which is remarkable, when we consider its measurements, and how low is the height of the openings to the tribune. The details of this tribune, both without and within, well repay prolonged study. Another piece of design especially to be noted is the exquisite arcade that looks into the staircase. Not only its interesting carving but its elementary lines call for commendation. It is a beautiful work. The elevations of the interior ends, with their great arches, — arches made more interesting by the little doorways above them, that give access to the bridge which leads to the spirelet, — are carefully studied, and of noble proportions. The juxtaposition of grand leading forms with delicate details throughout the Colt Memorial Buildings is well worthy of attention, and is to be remarked in much of the architect's other work in various places; notably in St. John's Church, Yonkers, N. Y.

Design, in the sense of selection and judgment, as differentiated from ornament and unrelated details, is shown in the solidity of effect given to the parish-house by the exterior treatment of the staircases at the angles of the building; the windows being mere narrow slits without decorative form, finish or color.

[1] This saying that "the arch never sleeps" originated with the Arabs, doubtless owing to their experience with the Moorish Arch, which they have so much employed. It may be admissible, from the layman's merely sentimental point-of-view, to assign credit to the arch for its sleeplessness, but that the arch never ceases, more or less, to jeapordize its imposts, and, consequently, the whole wall in which it occurs, has always hitherto been considered its vice; and the architect takes a bold stand, and one apparently at issue with his professional obligations in his practice, who cites the fact as a virtue. For the first requisite demanded of the mass of a building is stability, and the upholders of that mass, the arch no less than the column with its architrave, should be inviolable by any coördinate stress or strain. Nearly all Europe's Gothic work of the mediæval era, comparatively near as that epoch is to our own, is tied up with iron to reinforce its original construction, whereas the trabeated temples of Greece and Egypt, thousands of years older, stand to-day, when untouched by earthquake or the destroying hand of warfaring or stone-quarrying man, as intact as when erected.

[2] Statues of "Fortitude," "Truth," "Friendship," "Fidelity" and "Magnanimity."

NOTES AND CLIPPINGS

First Steps in the Philippines. — When the Filipino sets out to build a house there is one thing that he never omits, that is, to erect the apparatus by means of which all his children will learn to walk. This is done by cutting a hole in the floor of his high and dry dwelling, through which he passes a long hardwood pole, sharpened at one end, which he drives in the ground below, until the part in the house stands about 19 or 20 inches above the floor. He then makes that part of the hardwood pole in the house firm and solid by driving wedges into the interstices formed by the passage of the stake through the split-bamboo floor, and, when all this is done, his next care is to secure a section of bamboo about half a foot longer than the length of the hardwood stake from its top to where it enters the floor and double the circumference of the latter. This section of bamboo is, of course, hollow, and fits over the hardwood stake like a glove. The apparatus is now about finished, and lacks only two things in order to be ready for business. This Mr. Filipino soon attends to. First he bores a hole through the two opposite walls of the bamboo sheath, at the top, where it extends upward about half a foot taller than the stake, and into these two holes he inserts a long hardwood handle which extends at right angles to the upright stake and bamboo case, thus completing the apparatus for teaching children to walk. The manner in which this curious arrangement is operated is very simple. When the mother of a family thinks that it is time for one of her youngsters to learn to walk she simply places the child on its feet, and with its hands grasping the bar, or handle, of wood extending out from the bamboo cylinder. Sometimes the child is tied by the waist to the handle, which the youngster grasps with that peculiar firmness characteristic of all children and especially those of savage tribes, and which, the evolutionists say, is a legacy from our simian forefathers, who lived in trees and who were obliged to hold fast and firm to the limbs or fall. And the minute that baby Tagalo does so the pressure of his body on the handle starts the bamboo cylinder to revolving around the hardwood core, so that baby, fearing lest he fall, clings to the rod with grim perseverance, squalling for his mother and trying hard to support himself by the handle, which continues slowly moving off and away from him. Thus, in an endeavor to keep from falling, and at the same time to keep pace with the slowly revolving cylinder, the child learns in a short time to walk. — *Washington Post.*

Permeable Walls. — Every one knows that air passes through the walls and ceilings of a closed room, and as long ago as 1878 it was proved that the rate of penetration depended mainly upon the excess of temperature of the inside air over that of the outside air. With walls of ordinary thickness it was observed that about one twenty-fifth of the atmospheric contents of a room would be changed for every degree Fahr. difference per hour. Thus, if the outer air were at 35° Fahr., and the air in the room at 60° Fahr., the latter would be completely changed in the space of one hour by transpiration through the walls. More recent inquiry seems to show that in the case of papered walls, it would not be safe to assume that much more than one-eightieth of the air will be changed per degree Fahr. per hour. Further, it is the fact that walls covered with paper containing oil varnish or a coating of paint offer considerable resistance to the passage of air. As very little provision is designedly made for ventilation in ordinary dwelling-houses, and especially in those at low rentals, the subject to which we now allude may well be considered by architects. The employment of reasonably porous building materials is clearly calculated to exercise a beneficial influence upon the atmospheric conditions of a dwelling-house or other building. — *The Builder.*

Berlin Elevated-railway Structures. — The Paris *Bulletin des Arts* praises the appearance of the new Berlin elevated electric road as an ornament to the city and a triumph for the architects. The ironwork is said to be really graceful in effect, while the stations are models of sightliness and convenience: all of which is, according to the *Bulletin*, in strong contrast with the Paris underground-road stations, which are condemned as insults to the public. The secret of the Berlin success is said to lie in the fact that first-class architects were invited by the Government to furnish designs for the work, and the best were chosen by a committee consisting of artists, architects and engineers. — *N. Y. Evening Post.*

Proposed Monument to Prison-ship Martyrs. — A joint resolution appropriating $100,000 for a monument to prison-ship martyrs to be erected at Fort Greene, Brooklyn, N. Y., was passed by the Senate June 27. It provides that the appropriation of $100,000 shall be made, on condition that an additional $100,000 shall be raised, the work to be done under direction of the Secretary of War, the Governor of New York, and the Mayor of New York City. — *Exchange.*

Originality. — The architects who have the alteration of the White House under way have been taking photographs by way of suggestion, in New York's City-hall, which architects are said to think is as nearly architecturally perfect as any building in the United States. But why not be original? — *Exchange.*

[If originality is the one thing to be sought, let the asker of the above question wear his shoes on his head in place of his hat. — Eds.]

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, JULY 26, 1902 No. 1387

CONTENTS

SUMMARY: —

The Fall of the Tower of St. Mark and the Causes that may have led to it. — The Cost of rebuilding it. — Exhibition Promoters and the Public Purse. — Fireproofed *vs.* Metal-covered Wood. — Suggested Moving Sidewalk for the Brooklyn Bridge. — The Fire Insurance Companies and the Automobile. — Boiler-tubes and their Expansion. — The New York Street-cleaning Department effecting a Saving in the Disposal of Ashes. 25

LIBRARIES IN THE UNITED STATES. — II. 27

LETTER FROM PARIS. 30

CHICAGO, FIFTY YEARS HENCE. 30

ILLUSTRATIONS: —

Accepted Design for the City-hall, Concord, N. H. — Side Elevation and Section of the Same. — "Loop-the-Loop" Architecture. — United States Post-office, Lockport, N. Y.

Tomb of Medea Colleoni, in the Colleoni Chapel, Bergamo, Italy.

Additional: A House on the Bay State Road, Boston, Mass. — "The Embarkation of Cleopatra": Fresco in the Palazzo Labia, Venice, Italy. — Details of the Same. — "The Banquet of Cleopatra": Fresco in the Palazzo Labia, Venice, Italy. — Details of the Same. 31

COMMUNICATIONS: —

Originality *vs.* Tomfoolery. — A Question of Commission. . . 31

NOTES AND CLIPPINGS. 32

ARCHITECTS will be anxious to learn the result of expert investigation of the causes which led to the fall of the Campanile in Venice. The newspapers seem to assume that the pile foundations gave way, either as a result of dredging in the Grand Canal, or, as one authority has suggested, through the effect of an earthquake. While an earthquake might possibly open a rift in the ground under the ends of the piles, and let them suddenly down, it is improbable that this would occur without the shock being felt to a certain extent in the neighboring soil; and the theory that the catastrophe was due to the undermining of the soil by dredging is also open to objections. Although we are gravely informed by one newspaper that "there are people who are saying that the subsoil of the city has deteriorated, and that the piles and pillars on which the buildings of Venice rest are rotting away," it is hardly necessary to point out that the "rotting away" of the "piles and pillars" of Venice is a phenomenon very little to be feared. A few years ago, some German engineers had occasion to remove the pile foundations of a bridge constructed by Julius Cæsar, about a thousand years before the Venetian Campanile was thought of, and the piles, after an immersion of nearly two thousand years, were found perfectly sound. It will be remembered, also, that the piles on which the lake-dwellings of Switzerland were built are still sound, after the lapse, probably, of at least five thousand years, and, perhaps, of a much longer period; so that, whatever may have been the matter with the foundation of the Campanile, it is very unlikely that the piles under it have "rotted away," or that those under any other of the ancient buildings are in danger of doing so, whether in consequence of "the deterioration of the subsoil," or for any other reason. If, on the other hand, the ground under the ends of the piles has given way, it is strange that the collapse of the tower should have been so sudden. Every architect who has practised in Boston or Chicago, or who has observed the old houses in Amsterdam, knows the effect of the yielding of the ground under a pile foundation. Far from collapsing suddenly, and letting the building over it come down with a crash, a subsoil overloaded in this way yields very slowly, for the obvious reason that the overloaded portions, pressed outward, must force their way gradually into the surrounding mass, whose inertia is increased by the weight of the water above it. In most cases years, and often centuries, pass before the effect becomes very noticeable, and, as the resistance of the subsoil is, practically, never uniform, the movement almost invariably takes the form of an inclination toward the softer part of the ground, which, at first hardly perceptible, increases very slowly.

IN the case of the Campanile, nothing of this kind seems to have occurred. The tower was practically vertical, and had remained so for a thousand years; and that the supporting earth should be so completely removed from under it in a few hours as to cause its total collapse, without any warning settlement, is hardly credible. Moreover, unless the failure of the subsoil took place uniformly over the entire surface of the ground covered by the piles, which is hardly possible, the tower would have sunk toward one side, and have fallen at length, instead of breaking down in a heap. Although it is hazardous to make guesses in regard to an occurrence at such a distance, it seems possible that the cause of the trouble might be found in the construction of the tower itself. Every one is familiar with the inclined plane, paved with brick, and supported by brick arches, which extended from the bottom nearly to the top of the tower, making some thirty-five turns. It is obvious that, in such a construction, the thrusts of the arches would, to a certain extent, accumulate from the top to the bottom, and, if the abutment should at any point be insufficient, the slightest yielding, by allowing the arch to flatten, would greatly increase the lateral pressure, at the same time that the abutment became less capable of resisting it. Most arched structures fail suddenly in this way, the first yielding of the abutment producing an increase of the thrust which carries everything before it. In the case of the Campanile, it is known that the walls were in bad condition, and they do not seem to have been improved by the cutting of a hole in the lower portion for the insertion of an iron beam, a proceeding which, as the newspapers inform us, caused the brickwork over the opening to "descend several inches"; and, the disintegration of the walls having once begun, the internal forces, no longer adequately restrained, would be sufficient to bring down the whole mass.

THERE is something rather unpleasantly suggestive of Italian astuteness in the discussion which is going on in regard to the reconstruction of the Venetian Campanile. Offers of pecuniary assistance have been received from all over the world, and the amount of the subscriptions promised for the purpose is said to be something like half a million dollars. Meanwhile, as the newspapers inform us, the Venetian authorities seem to look on gloomily, and make estimates of the cost of rebuilding the structure, which, it is given out, will be twelve hundred thousand dollars. As the tower was forty-two feet square, outside, and three hundred and twenty-five feet high, to the top of the decorations which crowned its pyramidal roof, a simple calculation will show that this enormous sum would give nearly three dollars a cubic foot for rebuilding a very simple brick structure, almost perfectly bare inside, out of materials which lie scattered over the site, the bronze doors, and a large part of the marble decoration, being uninjured, and ready to be put back in their places.

THE New York *Evening Post* speaks plainly and decidedly to the effect that appropriations of public money by Congress in aid of local "Expositions" should cease. Before adjourning, the last Congress appropriated more than six million dollars in aid of the St. Louis exhibition of 1904, and, if the affair should prove financially unfortunate, there is no certainty that appeals may not be made for still more money, as was the case with the Charleston Exposition, the gates of which were not even closed before its managers made an urgent demand upon the Government of the United States to make good the deficit in their accounts. If any such exhibition deserved to be helped in this way, it would be that at Charleston, where the people of a small city, nearly ruined by the concentration upon it of the destructive forces of the Civil War, made a brave and noble effort to claim again their place in the current of American life; yet the rejection of the petition by Congress was approved by most sensible people. The fact is that, as the *Evening Post* says, and as nearly all the most intelligent journals in the world have been saying for two years, every one is tired of great exhibitions. Even the Paris Exposition of 1900, although it enjoyed the great advantage of being held in a city which, alone, is a perpetual attraction to

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

all civilized people, was financially a failure, at the same time that, by its wearisome extent, it did much to disgust people with great exhibitions in general. One of the most interesting portions of the Paris Exposition was the annex at Vincennes, where not only the cattle and farming appliances, but the balloons and automobiles were shown; yet there were practically no paid admissions to the annex, the visitors to the main exhibition, although the charms of the annex were described in posters which were everywhere spread before their eyes, finding themselves too much fatigued, in mind and body, to take the short trip to Vincennes. The St. Louis Exposition, almost necessarily, is planned on a larger scale than any which have preceded it, in order to give room for the constantly increasing variety of exhibits which will seek a place in it; and, earnestly as we wish that the fair, and the very interesting things which will be shown there, may be properly appreciated, it seems too much to hope that a sufficiently large number of people will brave the weariness of sightseeing in the midsummer climate of St. Louis to make it so successful, financially and otherwise, as it will, undoubtedly, deserve to be. Except for Government assistance, this would probably be the last general exhibition in America for a generation, at least; but there is danger that professional promoters, hoping to divert a portion of the public millions into their own pockets, will continue, on various pretexts, to apply to Congress for assistance in such affairs, to the injury of the public; and we hope that it may be made known to these speculators that no more appropriations of the people's money for such purposes can be hoped for.

MR. BRUCE PRICE makes an excellent suggestion in support of the proposed amendment to the Building Code of New York, requiring woodwork in high buildings to be covered with metal. At present, the law requires woodwork in such buildings to be of fireproofed wood; but, as Mr. Price well says, architects have a certain distrust of fireproofed wood, the laboratory tests of which do not give very convincing indications of its behavior in a conflagration, while the various fireproofing processes are believed in the profession to injure, at least in some cases, qualities in the timber which are desirable. On the contrary, the covering of woodwork, particularly of doors, sashes and mouldings, with sheet metal has been practised for many years, with a success which is known to all architects; and there are very few of the latter who, if called upon to choose between metal-covered wood and timber treated by any process now in common use as a fire-resisting material, would not prefer the former.

SOME time ago, in the discussion upon the best method of relieving the congestion upon the Brooklyn Bridge, it was proposed to equip it with a moving sidewalk, like those which formed the delight of children at the Chicago and the Paris Expositions. The idea was favored by the engineer to the Rapid Transit Commission, and by Mr. Lindenthal, the Commissioner of Bridges, and it is now announced that a company is ready to undertake the construction of such a sidewalk, as soon as the necessary concession can be arranged. The plan already worked out contemplates a main platform, moving at the rate of ten miles an hour, approached by three others, moving at rates intermediate between this and absolute rest. In this way the transition between the stationary platforms and those moving at the greatest speed would be so gradual as to obviate all danger. In Paris, there was only one platform moving at a speed intermediate between that of the main platform and perfect rest, and more than nine million passengers are said to have been transported without a single accident. Whether the dense crowd which covers the sidewalks of the Brooklyn Bridge in the morning and evening could be transported with equal safety is, of course, undecided, but there seems to be no serious reason for doubting it. We watched many times the operation of the Paris "Plateforme Mobile," and, although we often saw people lose their balance, and fall, in stepping from one platform to another, they were not hurt, for the simple reason that the worst that could happen to them was to be rolled off the more rapidly moving platform to the other. Being guarded by railings, they could fall no farther than to the platform; there were no crevices in which their feet or hands could be crushed; and the most distressing mishaps were those in which small children, accompanied by their papas, or mammas, or big brothers or sisters, failing to step in unison with them from one platform to another, found their guardians carried mysteriously away from them until the latter could jump back again and return to their charges.

THE insurance-companies are studying the question whether a policy-holder can store a naphtha-burning automobile, or motor bicycle or tricycle, in the insured premises without vitiating his policy; and the answer to the question will interest a great many people. Few persons know how dangerous naphtha vapor is. According to one authority, if half a cupful of ordinary gasoline is thrown around the floor of a room of average size, and allowed to evaporate, and a lighted match is then thrust from the outside through the keyhole, an explosion will take place which will blow the windows out; and the same authority mentions an accident which occurred in Philadelphia, where a man in an upper story was cleansing a sofa with gasoline. The vapor of the gasoline descended the stairs, and reached a light sixty feet away. Instantly there was an explosion which blew out the rear wall of the house. It is not surprising that underwriters view with disapproval the storing of machines containing tanks of gasoline, held in, very frequently, by leaky valves, in rooms containing valuable property; and, while policy-holders who use automobiles will do well to study what their contract already says in regard to explosive fluids, it is likely that insurance boards will, before long, adopt some definite rules on the subject.

SEVERAL of the daily papers mention the alleged discovery of "an alloy of nickel and steel" which does not expand with heat, and they inform their readers that this alloy would be an excellent material for boiler-tubes, "whose varying length tends to impair their connections and create leaks." It is extremely unlikely that anybody has discovered an alloy of nickel and steel, or any other substance, or mixture of substances, which will not expand with heat; but, in case any one should discover such an alloy, it might be well to observe that it would be about the most unsuitable material for boiler-tubes that could possibly be used. As boiler-tubes are firmly fixed at each end into the heads of the boiler, it is obvious that every time that a boiler fitted with such tubes was heated, and the steel or iron shell thereby expanded, the inexpansible tubes would all be pulled out of their connections. It is true that boiler-tubes often leak, but this is due to insufficient, rather than excessive expansion, and the perfect boiler would be one in which all the tubes expanded at precisely the same rate as the steel shell, and were always kept at exactly the same temperature with the shell, so as to avoid the currents of cold air, and irregular firing, which cause leakage at the connections of ordinary tubes.

ONE member, at least, of the new administration in New York has earned the gratitude of his fellow-citizens by converting what has hitherto been a source of expense into a means of profit for the municipality. This official is Commissioner Woodbury of the Street Cleaning Department. Major Woodbury is, apparently, acquainted with the maxim that "dirt is matter in the wrong place," and has used his powers to redeem some of the dirt which New York gets rid of at such great cost, and put it into a position to be of value. In pursuance of this idea, he began, some time ago, to visit the various police-stations, and instruct the patrolmen in regard to the directions which they should give to housekeepers for separating ashes and garbage, which in New York, as in other civilized cities, are now required to be collected separately. The result of this sensible proceeding has been that ashes are collected from the houses almost clean, and, instead of having to be carried out to sea, they are available for any purpose to which inert mineral substances are adapted. In these days of "cinder concrete," there is a great demand for substances of this sort, which can be used, mixed with cement, for fireproof filling, and the Roebling Construction Company, finding the ashes, under the new system, clean enough to be so used, bought five hundred cubic yards, at eight cents a yard. As the cost of conveying this quantity out to sea would be sixty-five dollars, the net profit to the municipality in the transaction was one hundred and five dollars. As the quantity of mixed ashes and garbage sent out to sea before the inauguration of the new system amounted, on an average, to about seventy-five hundred cubic yards per day, the profit to the city, if it could all be disposed of in this way, would be nearly six hundred thousand dollars a year.

LIBRARIES IN THE UNITED STATES.[1]—II.

NEW YORK PUBLIC LIBRARY.

THE design for the New York Public Library, which is now being erected, is the result of two competitions held in 1896 and 1897. In the limited second competition twelve firms of architects were selected from those competing in the preliminary open competition out of a total of eighty-eight. Tentative sketches of the plans of each floor were issued with the instructions. The assessors (with those selected by the competing architects), Professor Ware, of Columbia University, Dr. Billings, the librarian, and Mr. Bernard R. Green, of the Congressional Library, finally selected a design which practically adopted the whole of these suggestions. There have been variations since made, during the preparation of the contract-drawings, but these have not been of great importance and will be noticed later.

The site is one that allows of an isolated building, between Fortieth and Forty-second Streets on Fifth Avenue, with ample space for future extension, 455 feet frontage and 482 feet to the sides. The cost of the building (without fittings, etc.) was not to exceed £340,000, but it will have greatly done so — nearly twice that amount.

There are many interesting points in the conditions of competition which are worthy of study. They are extremely minute in detail. The main points determined upon by the assessors and trustees in regard to the planning are important principles, which after great study and consideration they adopted, and these make the New York Public Library perhaps the most important library now being erected in the States.

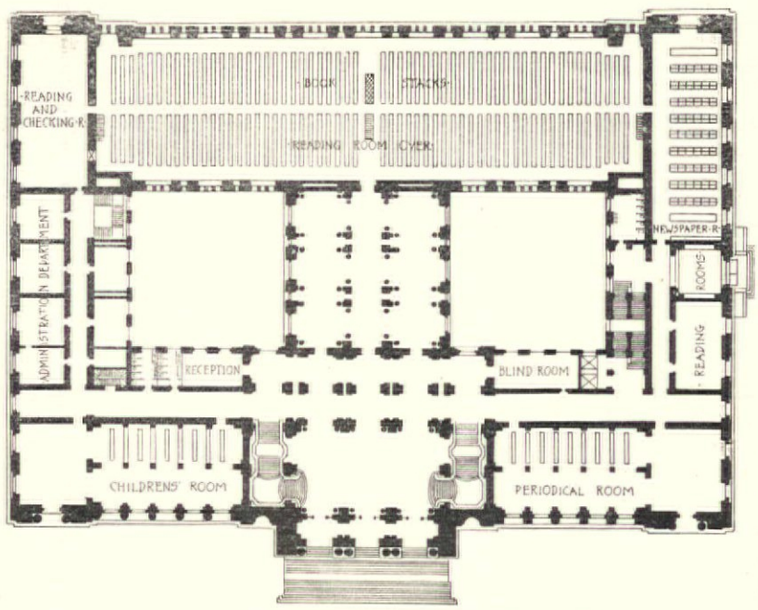
The following are three important conditions laid down, and they have not been essentially departed from, viz.: —

1. The stack was to be placed at the back, or west side, of the building, six floors in height.

2. The main reading-room for 800 readers was to be placed over it.

3. The lending delivery-room was to be placed in the basement, in the right-hand court, to be top-lighted and with entrance from the side street.

"By concentrating the book-stacks in a rectangular block on the west side, and placing the public reading-rooms above them on the third floor, with access to the stacks on each floor at the north and south ends and in the middle of the east side, the central supervision of the reading-rooms and the central delivery of books can be secured by very simple mechanism; free and direct communication between the administrative department and the book-stacks can be maintained and opportunity for easily extending both the book-stacks and the reading-rooms towards the west can be provided for whenever this may be desirable. Moreover, reading-rooms placed at the top of the building are not only quieter, better lighted, and more easily ventilated, but they can be constructed without encumbering the floor with columns." (Terms of Competition.)



New York Public Library. Messrs. Carrere & Hastings, Architects.

These are some of the advantages to be derived from the scheme, the adoption of which has resulted in a magnificent working-plan. They are immensely great, and if for one moment the plan of this library is compared with that of Boston it will be easily seen how rapidly the science of the librarian has developed. Of course, the Boston library was fine for its time. Both architects and librarians had to learn what was wanted. The library building as understood now in the United States, planned for its open-shelf rooms, rooms arranged for free access to stack, and well-fitted children's rooms, is quite a recent development, and each year progress is made towards the creation of the ideal plan.

The entrances to the basement are in Fortieth and Forty-second Streets: the one from the latter street (the north side) enters centrally and through halls directly into the lending delivery-room, 83 feet square. The west wall of this room has eight openings into the stack-room, and the delivery-counter will be placed just outside, extending the whole length of the room. The whole is top-lighted, the space above forming one of the two inner courts. Quite adjacent, between the delivery-room and the entrance, are placed the public lavatories and elevators and stairways to upper floors. The room to the north end of the stack is used for the patents-library: it is 36′ 6″ x 83′ 6″, and is really a continuation of them. The first floor of the stack is level with this basement floor. It is 297 feet long by 78 feet wide. The stacks are arranged in two rows, 5 feet centres, 7 feet 6 inches clear spaces next walls, and 5 feet central gangway north and south. The stairs are arranged at the two ends and the centre; the book-lifts are also placed in the centre of the room. There are altogether seven floors of stacks, each 7 feet 6 inches floor to floor, except the top, which is 8 feet 6 inches, to allow for extra depth of reading-room floor and arrangements for the mechanical book-carrier. The height of the basement is two floors of the stack; that of the first floor, three floors of stack; and the second floor, two floors of stack.

The left, or south, entrance is used for the administrative portion of the building, and has a driveway which leads directly into the court, balancing the court on the north side. This court will be used as the automobile station — automobiles being used for distributing to the branch libraries. It is on a level with the street outside. To the west of the drive is the packing and issue room, 36 feet 6 inches wide and 83 feet 10 inches long, with a room at the entrance to it 23 feet square. Either side of the driveway outside the main building — between it and Fortieth Street — are placed at the sub-basement level, which is 13 feet in height, the coal-room, 90′ x 32′, and the engine-room, 116′ 6″ x 31′, both top-lighted.

The printing-shop, the bookbinding-shop, and store, are placed in the front left-hand corner of the building, and occupy very large areas. West of these, and lighted from the south court, are the lavatories for the male and female employés, stores, workshops, scrub-women's room, etc., and the large space between the courts is assigned to the machinery.

On the first floor is arranged the very fine exhibition-hall, 75 feet square, placed directly opposite the main entrance between the inner courts. Either side of the great entrance-hall the stairways are placed to reach the second and third floors.

The children's reading-room and the periodical-room are placed to the right and to the left of the main entrance. These rooms, which are each 125 feet long by 45 feet wide, are practically divided into three separate rooms by piers — the portion away from the window being divided into alcoves by book-cases. The south-west corner and south side are occupied by the administrative and working departments. The large room next the stack is the receiving and checking room — the other rooms being the superintendent's offices, reception-room, telephone, stores, girls' and boys' lavatories — opposite children's room.

In the north-west corner, north side, are placed, next the stack, the newspaper-room, 111′ x 37′, two reading-rooms — one 46′ 10″ x 24′, the other smaller — stairways, elevators, and public lavatories, and also a room 46′ x 18′ for the use of the blind.

The second floor contains on the south side the administrative rooms and on the north side and central block, between the courts, the special libraries and their reading and study rooms. The administrative rooms are the accessions and cataloguing rooms, adjoining the south end of stack; and the order-room, trustees' room, directors' room, staff lavatories, etc. The room for documents is placed adjoining stack in the northwest corner, and there are special rooms for economics, science, Bibles, Oriental literature, with special reading-rooms and studies adjoining.

On the top floor the great reading-rooms, as before stated, are placed. There are four of them altogether. To reach the main one, the one second in size has to be crossed, and the other two are placed at each end of the main one. These end rooms can also be reached from the side corridors. Altogether they will make, perhaps, the finest suite of reading-rooms in the world. The main one is the same size as the stack-room below, 297 feet long and 78 feet wide. It is lighted by large semicircular-headed windows on the two long sides, each 14 feet wide, 8 feet 6 inches high from sill to spring of head, the sill being 15 feet from floor. The end rooms are each 36′ 6″ x 83′ 6″, lighted in a similar way on the outer wall. The room at the approach to the main room is 78 feet wide by 84 feet 3 inches long, and is lighted by similar windows on the two sides toward the courtyard. At present little or nothing has been settled as to the fittings of these rooms, so they cannot be described.

The other rooms on this floor are for manuscripts, rare books, Americana, prints, maps, music, art and architectural books, photographs, special reading-rooms, and public toilet-rooms. There are also four large art-galleries.

[1] A paper by Sidney K. Greenslade [*A.*], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal* of the Society. Continued from No. 1386, page 22.

Altogether this seems nearly as perfect a library as is possible. The magnificent group of reading-rooms on the top floor, with the huge stack below; the very fine approach to these rooms from the main stairways from the first to the third floor so arranged as not to return on themselves; the position of lending delivery-room — its very direct connection with the street and the stack, and its isolation; the arrangement of the children's room and periodical-room, with their separate stacks and easy access from the main entrance; the possibility of future extension of both main reading-room and stack-room easily assured without interfering with existing arrangements — are among the very many features that call for particular comment.

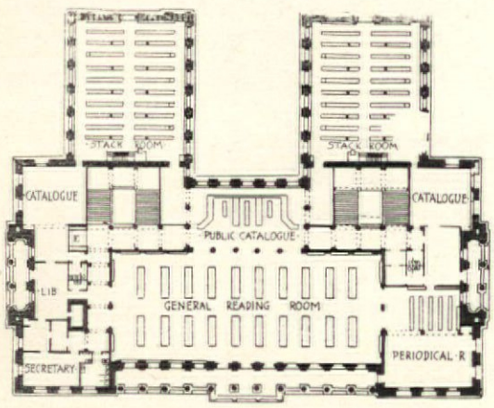
The cost will be about £660,000, and the shelving capacity is for 2,000,000 volumes. The architects are Messrs. Carrère & Hastings, of New York.

THE STATE HISTORICAL LIBRARY, MADISON, WIS.

The State Historical Library building at Madison, Wis., is an extremely well-planned building, and forms an ideal reference-library. The main building has a frontage of 210 feet and a depth of 105 feet. At the rear of this project the two stack-buildings, each 100 feet wide by 110 feet deep. It consists of four floors and a basement. Three of the floors are devoted to the purposes of the library; the basement is chiefly for storage, particularly for newspapers, and the fourth floor is allotted to the museum and art-gallery.

The building is entered from each of the four sides, and two large staircases are arranged in similar positions either side of the main hall, which is placed centrally, leading to the upper floors. Adjoining these staircases are the public toilet and cloak rooms. The other rooms on this floor are the patents and public documents, 37′ x 45′, with two floors of stack to a portion of the room; the atlases, maps, and manuscripts, 26′ x 29′; current newspapers, 18′ x 24′; newspaper-files, 10′ x 32′; the stack-rooms, only one of which is at present built; and seven special study-rooms, varying in size and capable of shelving 20,000 volumes. This first floor is level with the first floor of stack, and each of the other floors of the building come every two floors of stack in height.

The book-stacks are each 48 feet wide by 60 feet deep, and consist of six floors, 7 feet 4 inches in height, fitted with steel stacks.



Second Floor: State Historical Society Library, Madison, Wis. Messrs. Ferry & Clas, Architects.

The staircases, elevators, and book-lifts are placed at the ends adjoining the main building. The stacks are placed at 5-foot centres, and in two rows across the building, each 18 feet long, with 5-foot central and wall passage-ways. Desks are provided for the use of readers given direct access to the shelves. Each floor of the stack will shelve 40,000 volumes.

On the second floor is placed the general reading-room, 48′ x 118′ and 30 feet in height, with 20 tables 12′ x 3′, each seating 12 readers. Around the walls are shelves for 5,000 volumes. The approach to it from the stairs is particularly good, as well as the position of the delivery-counters, and the delivery-hall with the public catalogues. These are all adjacent to the main reading-room, being separated by a row of columns, and are also quite near the landing-lobbies on either side. This delivery-hall is 50′ x 28′, and on either side of it are the issuing-rooms, 27′ x 10′, connecting with stack.

In the left wing are arranged the official catalogue-room, 29′ x 44′, with entrance to stack-room, the librarian's office, 15′ x 26′, with other offices, all adjoining.

In the right wing opening out of the reading-room, is the periodical room, 39′ x 45′, with its own double-storied steel stack placed in the rear of the room, the front portion being fitted up for readers.

On the third floor, owing to the general reading-room going up through the two stories, the floor-space is greatly reduced. In the left wing is the lecture-room, 30′ x 39′, to seat 200. Over the delivery-hall is a room for art and genealogy, 18′ x 50′, with two studies either side, and divided off from the visitors' balcony overlooking the reading-room by a low railing. In the right wing are six additional special study-rooms.

Ultimately the building will house 675,000 volumes.

Architects: Messrs. Ferry & Clas, Milwaukee.

UNIVERSITY LIBRARIES.

The two buildings that are particularly worthy of attention are both in New York, the one belonging to the Columbia University and the other to the University of New York. They are not unlike in plan, both in general outline taking the form of a Greek cross. The great central reading-room, in one case octagonal and in the other circular, is the motive of the design in each building. Special study-rooms, with their books stacked around them, or near them, are an important feature of both these libraries, and in each are treated in a different way.

Often a special library-building is erected for a special subject. The recently-erected library of the Law School at the University of Pennsylvania, Philadelphia, is an interesting example.

COLUMBIA UNIVERSITY LIBRARY.

The Columbia University Library building is, perhaps, the most monumental of those yet erected in the United States, the one at the sister university of New York being much smaller, and only in that way taking a second place. The outline of its plan is that of a Greek cross, the arms being very short and wide, the width across them being 200 feet.[1]

The great feature of the building is the magnificent domed reading-room placed at the intersection of the arms of the cross. It is octagonal in form, the four sides at the angles being shorter than the others, and the whole is covered by a great dome. The lighting is from four very large segmental windows following the lines of the main arches at the sides. These windows are in the outer walls of recessed spaces, following the arms of the cross, the outline of the main building.

The main entrance to the building is approached by terraces of steps, 52 altogether, through the magnificent entrance-portico of 10 Greek Ionic columns. This is on the main floor-level of the library. There are other entrances in each of the four corners of the building at the basement-level, and it is these entrances that are generally used by the students, who reach the library from various parts of the grounds. A staircase at each of these entrances reaches the great corridor which surrounds the reading-room, and from which it is approached by the reader from the side opposite the catalogue and delivery space, in the left-hand arm of the cross. This corridor is 10 feet wide, and is separated from the reading-room by four marble columns in each of its four open sides. Between these columns are arranged bookcases, forming screens between the corridor and the room. In two cases only are there openings, one opposite the main entrance, where a locked gate is placed, with plate-glass, so as to allow visitors to view the room without disturbing the readers, and the opening opposite the delivery-counter, for the use of the readers and attendants.

It was originally intended that the assistant-librarian's desk should occupy a raised position in the centre of the reading-room, as at Washington, but it was abandoned at his request, and it is now placed on the right of the entrance to the room, with staircase and lifts to stack-room below adjacent. The reading-room is 75 feet square, with octagonal angles, and accommodates 152 readers. The tables are arranged in concentric circles, four rows altogether. The readers on the outer ring have each allowed them a space of 2 feet 9 inches, the second row 2 feet 11½ inches. The tables from front to front are 5 feet. They are sloped slightly, and between each reader is a slight tapering division-bead. The oak bookcases in the reading-room contain 12,000 volumes, all reference-books, divided into various classes, each case being distinctly labelled. The large central octagonal case has shelves both inside and out, as well as a case within it in which the bound magazines and reviews are placed. The cases between the columns are placed on a marble plinth in the form of two steps 1 foot 9 inches high, the total height from floor being 10 feet 1½ inches to top of cornice, the height in the clear for books being 6 feet 6 inches. The spaces between the first and second steps of plinth are fitted with gratings for extracting the foul air from the room.

On the same floor as the reading-room the arms of the cross are arranged into the following rooms, viz, the entrance-vestibule, with the trustees' room on the right and president's public office on the left, occupy the south arm; the architectural library is placed in the east arm, with a separate reading-room, and balancing the latter are the Greek and Latin seminar rooms; the law library, with its conference-room and dean's office, is placed in the north arm; and the left is chiefly administrative — librarian's room, accession room, cataloguing and delivery and temporary periodical room, which eventually will occupy the space used by the law-library when a special building is erected for it.

The stack-room is placed in the basement under the main reading-room. The stacks are of oak, and run from north to south, with a 5-foot central gangway east to west. They are 18 inches wide and 2 feet 11 inches between. The shelves are 2 feet 6 inches long, having 2-inch divisions between them. They are 8¾″ x ¾″, the first one raised from the floor 3 inches. The floor to the second stack is of wood, carried on wooden joists. The height from the lower floor of stack to the floor of reading-room is 15 feet 4 inches. Each floor contains 75,000 volumes. These stack-rooms are inadequately lighted with borrowed lights from the corridors, and, therefore, have to depend on artificial lighting. There is also a stack-room below

[1] See plan and exterior view, *Journal* R. I. B. A., Vol. VI, pp. 220-21.

the law library, from which it is reached by stairs, with book-lift adjoining, adjacent to the attendants' desk.

The law library is 60′ x 37′ 6″; it is fitted with tables 2 feet 11 inches in width and 14 feet in length, 2 tables to each of the 7 rows. They are 4 feet 1½ inches apart, and seat 6 readers on each side. The room is panelled to a height of 7 feet 6 inches on window side and 10 feet 6 inches around the three other sides, with shelving fitted-in. Extra space for readers is obtained by a small iron gallery, about 5 feet 6 inches in width, placed around three sides of the room, fitted with 16 small tables accommodating 2 readers each. From this gallery doors on either side lead to the law-professors' rooms. The number of readers provided for is: in gallery, 32; main floor, 189; total, 221.

The architectural library is about 37′ 6″ x 65′, capable of shelving 12,000 volumes. It is divided into five bays by cases forming alcoves, and tables 3′ x 9′ are placed in each. Those next the outer wall are well lighted, but the ones in the inner alcoves are dark. The division cases separating alcoves next windows are 2 feet wide and 8 feet 11 inches to top of cornice. They have 4-inch panelled ends, and 2-feet 6-inch shelves in the clear between 1⅞-inch uprights, and are four divisions in length. The shelves are of ¾-inch wood, grooved for iron runners. Portions of the upper walls are also shelved, and where this occurs an iron gallery, 9 feet 4 inches from floor, is placed. The total height of room is 18 feet, and the accommodation provided is for 40 readers.

Over the architectural library and in the corresponding arm over the delivery-room are placed the seminar rooms, with their stacks. These are very well schemed. Each room is 12′ x 14′, and there are seven of them: the whole of them can be thrown into one room, being divided by 3-inch oak-framed divisions, which can be drawn out easily. On the inner sides of these rooms are arranged the steel stacks, with a passageway next wall, and from which, between the stacks, the rooms are reached. One table is placed in each room, 3′ 10″ x 7′ 6″, to seat 8 readers, and in a corner of each of the rooms is fitted a case with 12 locked drawers and 27 open pigeon-holes for students' papers.

There are two floors of stack, with a total capacity in each wing of 100,000 volumes.

On the third floor are the lecture-rooms. Eventually, the two wings over the seminar rooms will be fitted in a similar manner to them: at present they are only temporarily divided. The galleries to the main reading-room are at this level and are used partially for stacking books and for visitors viewing the reading-room. The stacks in these galleries are in two heights, and in the four contain 64,000 volumes.

Architecturally this building is very fine, and to obtain this fine effect it is evident that one or two utilitarian points have been rather sacrificed; this applies particularly to the arrangements for the storage of the books below the main reading-room, where light is greatly needed. On the other hand, the general arrangements of the reading-rooms with their fittings and the special study-rooms are all particularly good.

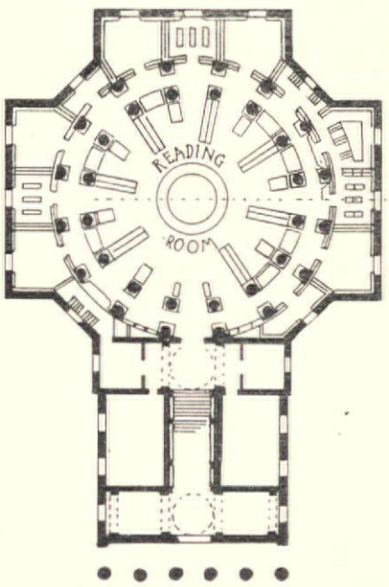
The total shelving-capacity for books is for 1,050,000 volumes, and the cost of the completed building was £240,000.

Architects: Messrs. McKim, Mead & White, New York.

NEW YORK UNIVERSITY LIBRARY.

The Library at the New York University is much smaller than the Columbia University Library, and the scheme of the plan is decidedly more compact. The general outline — that of a Greek cross — is the same, the entrance-arm being longer than the others. The extreme width of the building is 102 feet, and from the outer face of the column of the portico to the west wall 160 feet. As in the Columbia Library, the great feature is the domed reading-room, but it is circular on plan instead of being octagonal, and the books are stacked round about it and not below, and, are, therefore, generally more accessible. The main entrance is from the east front, and from the large hall, with its staircases either side leading to the auditorium below, a broad marble staircase of 24 steps 12 feet wide leads to the reading-room. Before the reading-room is entered a small domed vestibule is reached, and from it to the right and to the left are the chancellor's and librarian's rooms, and over these rooms are the two cataloguing rooms and the periodical and newspaper reading-rooms.

The reading-room is 54-feet 3-inch diameter to the inside face of the 18 marble columns, and has an ambulatory around 5 feet between the faces of the columns. Between the columns glazed cases for large books or portfolios of the same height as the tables are arranged, so that readers in reaching their seats do not disturb one another, the approach to the tables being only between certain of the columns, conveniently arranged near the stairs to the seminar rooms and the main entrance to the room. The central portion of the room is occupied by a circular table 20 feet in diameter, seating 24 readers. There are besides 8 tables 12′ x 3′ 8″, each seating 8 readers: these are placed radiating towards the centre, and between these long tables are smaller ones, 3′ x 5′, each seating 4 readers, the seating-capacity of the room being for 120 readers. The delivery-desk is placed facing the ambulatory and occupies the second bay to the left on entering; adjacent to it are the stairways leading to the various seminar and reading-rooms, and it has telephone-connections with all the rooms in the building. The two bays either side directly on entering are fitted for the card-catalogue, and suitable tables for its use are placed adjacent. The whole of the space between the columns of the wall of the ambulatory is shelved for books. It is three tiers in height, each 7 feet 6 inches, with galleries over the ambulatory to the second and third floors. The first galleries are arranged between the columns, one to each bay, and only project slightly. Each bay is divided into three divisions vertically, the central division being hung as a door and opening with all its books inwards. The second gallery, with its glazed floor, goes around the whole room, and nearly projects to the outer face of the inner columns. Thus, nearly the whole of the circular wall of the main reading-room has been utilized for the storage of books. The doors leading to the book-rooms are themselves book-stacks swinging on central pivots.



Main Floor: New York University Library, New York N. Y. Messrs. McKim, Mead & White, Architects.

Around the base of the dome is another gallery where thousands of books, when necessary, may be shelved. Unlike the Columbia University reading-room, here the lighting is by a circular skylight 20 feet in diameter in the centre of the dome.

From the ambulatory on the main floor and the galleries on the third and fifth floors are arranged 18 seminar rooms, which are devoted each to a special subject. As will be seen from the plan, these rooms are curious in shape, averaging 18′ x 14′, each provided with 2 tables, 3′ x 5′, for 4 readers. Shelving is placed all around the room, and at a height of 7 feet 6 inches, a glazed gallery with more shelving and stacks projects from each wall. The capacity of the shelving already installed in the building is for a quarter of a million volumes. Should it be necessary at any time to increase the shelf-room, this can be done by using the large auditorium below the reading-room for stacks, and would give the library a total capacity of a million volumes. The galleries to this auditorium are sometimes used as a reading-room.

The principle of the seminar rooms is excellent. They are very conveniently arranged, but the shape of them is awkward and the size small, and the upper ones with the top lighting become very hot in the summer.

The arrangement of shelving between columns to circular wall of reading-room, with the galleries for approaching it, is very well managed, and the effect good. The position of the card-catalogue so near the entrance and the way it is fitted into the wall is most convenient.

Architects: Messrs. McKim, Mead & White, New York.

PENNSYLVANIA UNIVERSITY LAW LIBRARY.

The library of the Law School at the University of Pennsylvania has a remarkably well-arranged and convenient plan. It is a building of two stories, with a frontage of 175 feet and a depth of 105 feet. Practically, the whole of the first-floor plan is occupied by lecture and class rooms, and it is the second-floor plan, where the book-stack and reading-rooms are placed, that calls for comment.

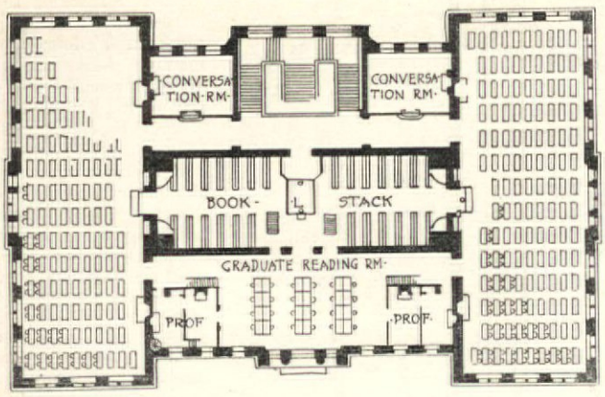
The book-stack occupies the centre of the building, there being entrances to it from each of its four sides, the landing of main staircase, the two large undergraduates' reading-rooms at each end of it, and the graduates' reading-room opposite the staircase and entrance. To the undergraduates' reading-rooms are delivery-counters, 2 feet 4 inches wide and 2 feet 9 inches high, and with gates at sides, each with an attendant. From the graduates' room there is free access to the stack-room.

There is room for five floors of stacks: at present, only one floor is fixed. The width between stacks is 3 feet 6 inches and the central gangway is 7 feet 6 inches. The librarian's office is placed in the centre and is enclosed by glazed screens. The whole is top-lighted the full length, the roof being a simple steel-trussed one, and additional light is obtained for the two top floors by windows over the main staircase. All the entrances from reading-rooms to stack-room have two iron shutters.

Either side of the main staircase are two conversation-rooms, each 22′ 6″ x 18′. The two large undergraduates' reading-rooms are each 42′ x 100′, well lighted on three sides. Each room is fitted with 126 dual desks for 252 readers. These desks are 5 feet 4 inches long, 2 feet wide and 2 feet 6 inches high. The space between front to back is only 1 foot 8 inches and the gangways between them 2 feet 5½ inches. Each desk has two locked drawers, and is fitted with a small brass upright ticket-holder and electric-bell to delivery-counter. A book being wanted by a reader, the ticket with number of desk is

inserted in the holder, and the bell to the attendant's desk rung, which gives the number of row of desk; a boy is then sent to collect the ticket, and the book is brought without the reader being disturbed. The desks in these rooms are much too crowded.

The reading-room for the graduates is much smaller — only 27′ x 48′, accommodated to seat only 24 readers. The desks are arranged



First Floor: Library of the Law School, Philadelphia University, Pennsylvania. Messrs Cope & Stewardson, Architects.

in 3 rows each, seating 4 readers on a side: they are 5 feet wide and 18 feet long. There are 3 drawers to each desk, the tilted drawers for books on the left of the reader being a particularly happy idea: practically, it forms a shelf for 8 or 9 volumes without crowding the desk. The lavatories are arranged in a mezzanine floor off the half-landing. There are 4 professors' rooms either side of the graduates' reading-room and 4 more over them. A gallery connects these upper rooms with the stack, passing through the graduates' reading-room.

Architects: Messrs. Cope & Stewardson, Philadelphia.

[To be continued.]

PARIS

ARCHITECTURE AT THIS YEAR'S SALONS.

A LITTLE while ago, M. de Baudot held a "conference" on contemporary architecture. It troubled him to see that our times had no new style of architecture, seeing that it had at its disposal new kinds of material which could lend themselves to new forms. He was wrong in not doing justice to the efforts made to get away from the superannuated Classic style which lends itself ill to the solution of modern programmes. The Guimards, Sauvages, Plumets and many another have sought, and sometimes have found, new forms. M. de Baudot himself has indicated what paths might lead to the creation of the style of our times. But one must know how not to be too exacting at the start. We are passing through a time of transition, whence, perhaps, something will issue. We must know how to wait. In this connection, and from the modern standpoint, the small amount of architecture exhibited at the Salon of the Société Nationale is far more interesting than the great quantity of banalities hung on the walls of the Artistes Français.

Making exception of the archæological work by M. Eustache, and the restorations of the ancient theatre of Louis by MM. Gaudet and Prudent, making exception also of a quantity of beautiful water-colors which are agreeable to the sight, there remain but a few good studies and these are little calculated to revolutionize the art. There are some which make us share the regrets which M. de Baudot expresses. Take the case of M. E. Meyer, who was called on to solve a programme which was essentially modern, — a sanatorium, and more than this, this sanatorium was to be built in the environs of Paris. Here was the very chance to seek for something new. The sanatorium is a new thing, and the present demands of hygiene have not been satisfied by the solutions of former times. Now, what does M. E. Meyer do? He draws his inspiration from Arabian architecture, and makes a mosque with flat roofs, small cupolas and minarets. No element of the style is lacking. Everything is very pretty, very brilliant, well studied, but deplorable from the chief point-of-view. But, my dear M. Meyer, we are not in Algeria, we are in France, in the environs of Paris, and this is the year of grace 1902.

The *hôtel* built by M. Guinot is also a very interesting study in modernized Renaissance. But consider how very contradictory are these two words, one beside the other. The architect who, in 1902, makes a Renaissance façade must, behind these walls, which belong to another epoch, satisfy the tastes and needs of the day, and prepare a modern plan. There are very many chances if a Parisienne is to inhabit this *hôtel*, that she will introduce in it a certain element of the "new art," certain chiffons, certain pieces of furniture with which the Renaissance style will surely make *mauvais ménage*. Just as it is interesting to come upon a building, Renaissance or of any other style you please, dating from a given epoch, and giving us, in consequence, information concerning it, just so it is useless to copy it, or which is worse, to draw inspiration, from the styles of antiquity in satisfying modern needs.

A villa at St. Cloud, by M. E. Arnaud, deserves attention for the ingenuity and good sense shown in its composition. Another, by M. Sauvestre, on Lake Léman, shows that architects can very easily discover elegant and interesting forms, without borrowing them from past times.

Scruples overcome me as I formulate these criticisms. Am I not unjust towards certain of my confrères who have had to yield to the demands and caprices of their clients? It is plain that it is difficult for an architect to build a "modern" villa for a client who demands a Renaissance *hôtel*. I do not deny these difficulties which paralyze one's efforts and intentions. The right of the client who pays the bills cannot escape recognition, and M. Guinot may have been obliged to submit himself to them. But M. Meyer would have difficulty in making me believe that any one demanded he should prepare a Moorish construction to shelter a sanatorium in the environs of Paris. We ought to combat a certain kind of ideas which our clients may have, but we should not be the first to drag them into paths of illogicality and absurdity. And unfortunately, we find at the Salon des Artistes Français some deplorable examples.

Many artists have protested against the scheme for the construction of a bridge over the Seine, where it would mask the marvellous perspective of the Cité from the Pont Neuf. What must one think of an architect who not only accepts this idea, but still further aggravates it by adding at the very middle of the bridge a mediæval tower, which will not only mask, but entirely suppress, with a single stroke, the graceful silhouettes of the Palais de Justice, of the St. Chapelle, and of Notre Dame. I do not care to give the name of the author of this vandal proposition, but I am sorry that any such idea could have sprung from the brain of any architect, and I declare that our artistic education has very far to go before the renovation desired by M. de Baudot and many others is accomplished.

M. Picq is much chagrined over the desertion that has befallen the garden and galleries of the Palais Royal. Formerly the centre of life and movement, they have become dead and deserted. M. Picq would like to resuscitate them, and exhibits a means of doing this as conceived by him: large openings on the streets neighboring the garden which at present is enclosed by buildings, creation of rampes accessible to carriages, etc. This attractive scheme may perhaps be realized, but it is not likely that it will be undertaken immediately.

Before finishing this brief account of the Salons of 1902, it gives me pleasure to say that the remarkable work by M. H. Eustache has been awarded the medal of honor at the Salon des Artistes Français. For their very interesting restoration of the Salle de Louis, MM. Paul Guadet and Prudent have obtained a first medal. The same recompense has been awarded to M. Bruel, for a restoration of Roman buildings in the southwest, and on the Palatine.

At the Congress of 1902, the Société Centrale des Architectes has, for its part, awarded grand silver medals to M. Eustache, and to MM. Paul Guadet and Prudent. So these artists, at least, have not seen their efforts pass unrecognized, a thing which, alas, does not always happen to architects.

CHICAGO, FIFTY YEARS HENCE.

"WITH about two years' residence in this city, I think our President must have meant to be funny when he called on me for 'Reminiscences of Early Engineering Works in Chicago.' But time has no beginning and no end, and past and future are but questions of the point from which you take them. To meet the challenge, then, I will simply shift this point to 50 years ahead, and speak of the 'Early Engineering Works in Chicago' from a standpoint in the middle of the century.

"I would first note, what perhaps is of most interest to those present: the way the city got its subway. The matter was discussed in the early part of the century. The city-engineer had one plan and other engineers different plans, but the telephone-companies, gas-companies, electric-light companies, water-pipes and sewer-mains went right ahead and used up all the space underground, so that when the public decided to do something there was no space left underground to do it in. This was a difficulty until an engineer of that day suggested that, as they could not make a subway below the ground, it would be just as well to put the sidewalks of the city up about 15 feet higher and have a subway already excavated, with the ground-floors of the tall buildings as basements.

"As the municipal street-car service of that day had a time-card of about an hour from 39th Street to Adams Street, it was very desirable to have the air-spaces between the raised sidewalks to sell to a new traction-company that would really fill some of the requirements of rapid transit. This, when sold, brought so large a sum that those who worked it through the Council actually could not get all of it, and the city then found itself in possession of a large sum to spend on improvements.

"The first thing to improve at that time was the Chicago River,

which had been so improved by the Sanitary District that its condition was intolerable. An expert commission was appointed to consider this problem, and a venerable member of that commission organized a search into the old files of the District. This unearthed a report of L. E. Cooley's of 1901, which covered the ground very thoroughly, and the commission made quite a reputation by recommending it. The work was carried out substantially on the project outlined by Mr. Cooley a quarter of a century earlier.

"Following this, it began to be apparent to the Government that an 8-foot waterway in the Illinois River was hardly suitable to connect with the 24-foot waterway across the Chicago divide. At that time, also, the position of Congressman was so much less profitable than that of Alderman that it was not difficult to get really intelligent men to send to Washington, and the interests of Chicago in a waterway to the Gulf began to be considered. The improvement of the Illinois River was developed just as it had been outlined in the ancient history of 1885.

"The lake-to-the-gulf waterway had quite an interesting history. The thousand miles from Cairo to New Orleans had been improved so greatly, at an expense of some eighty million dollars, that the depth was about 3 or 4 feet less than when the work was first started. There had been built an earth embankment along the river, shutting off the floods from the bottom-lands, and the high-water flow-line had risen until it was about up to the eaves of the houses of the people behind the levees.

"In that chapter of accidents which make the great floods of a river, the spring rains and melting snows came down the frozen slopes of the Allegheny, just as heavy rains in the northwest brought the Missouri and Arkansas in flood to join the Ohio, while warm weather in the lake district sent down the spring floods from the upper Mississippi and Illinois rivers. The earth embankments of the lower Mississippi went down before this combination, and the flood-waters swept over a thickly settled and highly cultivated district 40 to 60 miles wide and 500 miles long, from Cairo to the Gulf.

"This was the end of the plans of the Mississippi River Commission and a more rational project for improving the river and protecting the valley was adopted. In this a deep waterway was easily secured and finally joined to the improvement of the above from Chicago to the Mississippi.

"It is only recently that I went down the line in an ocean steamer and saw this dream of the centuries realized. But the weight of years was upon me and I was alone with the memories of its beginnings; perhaps it was malaria; but I summed up the history as follows: A great work is a great misfortune to the engineer who has the bad luck to first conceive it. It drives him to a life of effort without reward; dooms him to continued disappointments, and promises him that he will never live to see it accomplished."—*Mr. James A. Seddon, in the Journal of the Western Society of Engineers.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ACCEPTED DESIGN FOR THE CITY-HALL, CONCORD, N. H. MESSRS. WARREN, SMITH & BISCOE, ARCHITECTS, BOSTON, MASS.

SIDE ELEVATION AND SECTION OF THE SAME.

"LOOP-THE-LOOP" ARCHITECTURE.

WE copy this dizzy effort of Teutonic genius from *Architektonische Rundschau.*

UNITED STATES POST-OFFICE, LOCKPORT, N. Y. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

[The following named illustration may be found by reference to our advertising pages.]

TOMB OF MEDEA COLLEONI, IN THE COLLEONI CHAPEL, BERGAMO, ITALY. DRAWN BY MISS E. M. GREEN.

THIS plate is copied from the *Builder.*

[Additional illustrations in the International Edition.]

A HOUSE ON THE BAY STATE ROAD, BOSTON, MASS. MESSRS. LITTLE & BROWNE, ARCHITECTS, BOSTON, MASS.

"THE EMBARKATION OF CLEOPATRA": FRESCO IN THE PALAZZO LABIA, VENICE, ITALY. G. B. TIEPOLO, PAINTER.

DETAILS OF THE SAME.

"THE BANQUET OF CLEOPATRA": FRESCO IN THE PALAZZO LABIA, VENICE, ITALY. G. B. TIEPOLO, PAINTER.

DETAILS OF THE SAME.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

ORIGINALITY *VS.* TOMFOOLERY.

NEW YORK, N. Y., July 21, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,— Looking over your interesting weekly of July 19th, I was struck by your reply to an "exchange" on originality in architecture.

We all know that the primary colors have always existed and that the alphabet dates back a few thousand years, but still our artists and writers produce original works and surely no one will doubt the beauty of Shakespeare, though his very letters and words are identical to those of the Bible, the Iliad, etc. The colors of a Puvis de Chavannes are the same as of a Raphael; but no one will deny the claim to originality and beauty in Shakespeare and Puvis de Chavannes, and I cannot see why the underlying principles in architecture cannot be applied in producing results of equal beauty and originality. To discard the dictionary and the grammar, coin new words and new constructions, or to put the cart before the horse, or "to wear one's shoes on one's head," would be more accurately called *tomfoolery* than "originality." No branch of art or literature is more closely associated with man's life and pursuits than architecture and none more expressive and none more influenced by it; and consequently to produce beautiful and original works in architecture man must live beautiful, distinctive or original lives, and architecture must be made to conform to it and express it in all its phases; beauty and originality in architecture are results and not products, and therefore to strive for "originality for the sake of originality" is expressive of tomfoolery and not to be noticed. The lives of different nations that have lived beautiful and distinctive or original lives are wonderfully written in their architecture, as in the case of the Greeks and our own colonials, and while our Indians have been original their national life can hardly be called beautiful and their art clearly expresses it.

I might say that I am prompted in writing you this by a desire to arrive at the root of the argument, as I do not think the reply usually made that originality necessarily implies freak or absurdity elevates our profession, but rather stamps it as commonplace, and it would give me great pleasure to have your further views on the subject.

Very truly yours, ABNER J. HAYDEL.

[MR. HAYDEL very nearly expresses our views. Our quarrel is with those who make originalty not only their first, but their only aim, as for instance many of the expositors of "l'Art Nouveau." — EDS. AMERICAN ARCHITECT.]

A QUESTION OF COMMISSION.

JAMESTOWN, N. Y.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,— Kindly advise me on the following: —

If a Boston architect is requested to make rough sketches of a parochial-school building, "subject to the approval of the building-committee" and not to exceed $14,000, and submits sketches which are rejected by the building-committee on the ground that the arrangement is not suitable, and also that the building would cost very considerably more than the specified sum, is he entitled to a compensation, and, if so, how much? Your usually sound judgment and opinion in this matter will be highly appreciated.

This case, as you are aware, is a very old one, but I cannot recall having seen your opinion expressed on this vital question, and I am anxious to know to just what extent the architect is entitled to remuneration and to what extent the committee is liable under facts as stated above.

An early attention will be greatly appreciated.

Yours truly, INQUIRER.

[In general, an architect who submits sketches "subject to approval" is understood to agree tacitly that he will not claim any pay unless they are approved. In the present case, the agreement with the building-committee seems, in addition, to have included a covenant that the cost of erecting the building should not exceed fourteen thousand dollars, and failure to comply with this condition, at least within a reasonable margin, would entitle the committee to reject the sketches without paying for them, on the ground that a man who has agreed to furnish sketches for a building to cost fourteen thousand dollars does not fulfil his contract by furnishing drawings for one which would cost, say, twenty thousand; and his failure to perform his part of the agreement releases the other party from any promises that he may have made in consideration of fulfilment. We do not see, therefore, how the architect in this case can claim any compensation. — EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS

THE TUNNEL BETWEEN SCOTLAND AND IRELAND. — The proposed railway-tunnel between Scotland and Ireland, judged as one element of the general schemes which are now being mooted for shortening the distance of the ocean passage between Europe and America, is placed in somewhat the same category as the late Austin Corbin's dream for the creation of a great terminal port at Montauk, at the eastern end of Long Island; there being this difference, however, that when judged on that ultimate basis to which all such schemes must come — financial practicability — the Scotland-and-Ireland tunnel is even less feasible than Corbin's project. The cost of the tunnel is estimated by the contractors at $50,000,000, exclusive of interest, and, as matters now stand, there is not nearly sufficient traffic, either freight or passenger, to enable the scheme, if completed, to earn interest on the cost of construction. Nevertheless, in view of the rapid growth of commerce and the vast accumulation of capital seeking investment, it is conceivable that conditions may arrive in some future day that will guarantee the construction of a 34½-mile tunnel such as this. The engineering features of the tunnel were discussed recently in a paper read by James Barton, M.I.C.E., before the International Engineering Congress at Glasgow. Of the three possible locations for the tunnel, the one selected lies between Wigtonshire, Scotland, and the Irish coast, at a point where the distance from shore to shore is within 23 miles. The maximum depth of water varies, according to the line selected, between 480 and 900 feet. The route forms a through line between Carlisle and Belfast, and has the advantage of providing the best route from Scotland to the whole of Ireland, and from the north of England to Ireland. The survey for the tunnel proper commences 5 miles from Stranraer railway-station and finishes 5½ miles inside the shore line of the Irish coast, the total length of the tunnel being 34½ miles. Leaving the tunnel, the line extends for 10½ miles to the city of Belfast. The total length from Stranraer to Belfast is 51½ miles, 34½ of which is tunnel, and 25 of it beneath the sea. The roof of the tunnel is 150 feet below the sea-bottom. The proposed heading is 7 feet high by 10 feet wide. It is expected that the portion of it which is driven through the Silurian will be cut as rapidly as the Simplon tunnel, while progress through the Keuper marls is expected to be more rapid. It is estimated that the whole of the heading would be completed in less than ten years, and the tunnel finished in about twelve years. This estimate is based upon a comparison of the speed of driving 4 notable tunnels. The Mont Cenis was driven at the rate of 6 yards a day, and at a cost of $1,120 per yard. In the St. Gothard the maximum speed was 10 yards a day, at a cost of $710 per yard. In the Arlberg the maximum speed rose to 12 yards a day, while the cost was reduced to $535 per yard; and it is expected that on the Irish tunnel, judging from the quality of the material to be passed through and the improved methods now being used on the great Simplon tunnel, the speed will be increased and the cost per yard reduced still further. As to the question of water entering the tunnel, although the uncertainty on this point is admitted, the author of the paper does not consider that the difficulty will be a serious one. No water-leakage in any great quantity occurred during the construction of the Severn or the Mersey tunnels, at least in those portions of these tunnels that were immediately beneath the sea; and it is believed that the sea bed below the Irish tunnel has probably closed all faults in the rock sufficiently to keep out sea-water in any but easily-handled quantities. The line will be operated electrically from power-stations located near the main shafts at each end of the tunnel; and it is proposed to run trains at a speed of 60 to 70 miles an hour, thereby reducing the time in the tunnel to about half an hour. — *Scientific American.*

PLANTING ANTIQUE FURNITURE. — Occasionally one hears of an apparently honest countryman who plants sham antique oak in inns, farmhouses and cottages to ensnare the unwary; and then the prices that are obtained, after the reluctant consent of the family to part with the treasure "that belonged to grandmother," or "came from the big house," would gladden the heart of many a poor struggling broker who is trying to earn an honest livelihood. One of our leading artists told the writer that he had been "had" by a man dealing in pigs in X., a small village three miles from any railway, a very quiet place, and certainly one where the victim did not expect to find guile. This countryman would have dower-chests made from old oak, taking care that parts showing rottenness and age could be pointed out as a proof of genuineness, a place having been cut out for one of the large old locks and then partly filled up, a small lock some forty years old fitted, and half-broken old hinges added to secure the lid. These pieces would then be exposed in the yard leading to the sty as though of no value in their owner's eyes, and the action of the weather, mud and filth soon completed the artistic effect. Now, oak chests with quaint carving are always desirable pieces to possess, and when the artist, who was in the neighborhood sketching, casually asked a resident if he knew of any old oak, he was told that the pig-dealer had a rare old chest in his yard, which, no doubt, could be bought cheaply enough. Away went our connoisseur of oak, and found what purported to be a fine old chest decorated with most unusual carving, and having, moreover, linen-pattern panels. From the position it occupied, he imagined he could buy it for a sovereign; but the owner, used to dealing with men in various markets, chaffed the artist in bluff, honest fashion, and told him plainly he had thought nothing of it, but he was a dealer — a pig-dealer — and sharp as any one, and knew an artist-chap wouldn't want to buy an old thing like that if it wasn't worth more than he knew; and so on, until eventually he extracted £12 for the *trouvaille;* and, after an attempt to extract another five shillings for cartage, delivered it to the railway-company, who forwarded it to the artist's address in London. When, in the privacy of the studio, it was thoroughly washed and cleaned, it stood revealed a "fake," and a dealer who eventually purchased it from its disgusted owner for £3 candidly observed that he had given a very good price, as such things cost from the maker, when new and in proper condition for sale, £4 10s. — *Chambers's Journal.*

THE LARGEST SCHOOL. — Which is the biggest school? A writer in *Sandow's Magazine* claims that the Jews' Free School, Spitalfields, is the largest school not only in London, but on earth. There are 44 classrooms for boys and 27 for girls. Each room is fitted as completely as modern invention can make it. The fact that the school has never been closed owing to the spreading of any epidemic indicates the sanitary perfection of the enormous structure, now covering two acres of ground.

CAN'T RECOVER FOR DEATH IN ELEVATOR. — The Appellate Division of the New York Supreme Court has just handed down a decision affirming the judgment of the lower court and setting aside a general verdict in favor of the plaintiff in the case of Walter H. Griffin, against William De Forest Manice, owner of the building at the northwest corner of Pine and William Streets. Griffin was Secretary of the United States Fire Insurance Company, with offices on the eighth floor of the building. On December 6, 1898, while in the elevator of the building, he was killed by its fall to the ground floor. The defendant admitted the facts cited, but declared that the accident was not due to negligence. A jury rendered a verdict of $7,500, but Justice Russell set it aside. The opinion is written by Justice McLoughlin, with Justices Van Brunt and Ingraham concurring, and Justices O'Brien and Hatch dissenting. — *N. Y. Tribune.*

DEEP BORINGS IN THE UNITED STATES. — The deep well-borings of the United States, made for water, oil and gas, are the subject of a statistical report by N. H. Darton, in the series of water-supply and irrigation papers of the United States Geological Survey. All wells 400 feet or more in depth are carefully listed; depth, diameter, yield per minute, and other characteristic data are given, and many instructive details are noted indicating for what purpose the borings were originally made, the character of the product obtained, and whether the wells are in use or abandoned. The large product of natural gas in the East and the West, the enormous output from the oil-fields, in California, Texas and the East, and the considerable and indispensable water-supply furnished by the deep wells on the plains and in the arid and humid States, make concise and accessible information of this nature valuable for economic and scientific purposes. — *N. Y. Evening Post.*

DANGER FROM GAS-LEAKAGE. — An interesting discussion on gas-leakage and its possible effect upon health was held at a recent meeting of the New York County Medical Society. Annually in the large cities the gas-companies expect to have a leakage of over one thousand millions of cubic feet of gas. In recent years this has become much more dangerous in its possible effects than in the early days of gas-lighting, when ordinary coal-gas was employed. The gas produced in closed retorts by the destructive distillation of coal contained only a very small amount of the most poisonous ingredients, the carbon monoxid, or blue gas. Since water-gas has come to be employed almost exclusively for illuminating purposes the percentage of carbon monoxid present in illuminating-gas is over 30 per cent. There has been a suggestion in recent years that pure water-gas should be employed in cities for heating purposes. In order to be useful for illumination, water-gas must be carburetted — that is, saturated with certain naphtha derivatives. It is these substances which give the water-gas, as made at present, its characteristic penetrating odor. They also somewhat dilute the more poisonous gases which are present. The gas-expert who discussed the subject at the meeting referred to said that "if pure water-gas was to be supplied for heating purposes, the only safe place to live in New York City would be outside of it." Present conditions in our large cities add to the dangers of gas-leakage. Our pavements, especially in quiet residence streets, are usually asphalt, and are thoroughly impermeable. Gas that escapes from the mains is confined beneath the streets until it finds its way into the houses or into the sewers. There is no doubt that severe anæmias are becoming more frequent in city life. Dr. Lloyd pointed out at this same meeting that some of these anæmic conditions, associated with febrile temperature, malaise and headache, are traceable almost directly to sewer-gas. As it is well known that ordinary sewer-gas does not affect the health of workmen who are many hours each day engaged in the sewers, it would seem that only when large amounts of carbon monoxid find their way into the sewers, and thence into the houses, for the gas is highly diffusible, that so-called sewer-gas takes on such pathogenetic influences. — *American Medicine.*

COACHING ON GOOD ROADS. — But apart from all other considerations, the true way of making roads was not understood. This was not gained until the beginning of the last century. Macadam was the genius who evolved it. It is that of to-day, familiar to everybody, by which a hard and elastic surface, admitting of easy repair, is gained by the use of stone broken to a uniform, cubical size and shape, and gently sloped in the laying from the centre of the roadway to the ditches or channels at each side. What it meant may be judged by the old coaching results that immediately followed. In 1803 the distances between London and Shrewsbury, 154 miles; between London and Exeter, 171 miles; and between London and Manchester, 187 miles, were each done in a day. The roads were well maintained by the Turnpike Trusts, which were invested with powers for construction, management, and repair, and for taking toll for this purpose at the once familiar turnpike-gates. These in turn have been done away with, and maintenance provided for by a district rate. — *London Globe.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, AUGUST 2, 1902 No. 1388

CONTENTS

SUMMARY: —
In Advocacy of Trade Schools. — Pipe-conduits and leaking Gas-mains. — Fire-hazards due to Electrical Installations. — Investigating the Condition of the Public Buildings of Venice. — The Projected Realty and Building Trust. — The Contract for the New York-Brooklyn Tunnel. — Proposed Monument to Admiral de Ternay at Newport, R. I. . 33
LIBRARIES IN THE UNITED STATES. — III. 35
NOTES ON THE LATE PARIS SALONS. 38
ELECTRICITY A MATERIAL SUBSTANCE. 38
ILLUSTRATIONS: —
A Competitive Design for the Boston Athenæum, Arlington and Newbury Sts., Boston, Mass. Mr. C. Howard Walker, Architect. — Sections and Plans of the Same. — A Competitive Design for the Boston Athenæum, Arlington and Newbury Sts., Boston, Mass. Messrs. Parker & Thomas, Architects.
Pan-American Exposition, Buffalo, N. Y.: Pergola and Colonnade.
Additional: A House at Bar Harbor, Me. — House of Hon. H. A. Taylor, Washington, D. C. — Mantels, etc., in the same House. — Doors and Gateways, Halle on the Saale, Saxony: Two Plates. 39
COMMUNICATIONS: —
Library Architecture. — A Correction Denied. 40
NOTES AND CLIPPINGS. 40

MR. J. C. PUMPELLY writes earnestly in the New York *Evening Post* in favor of trade schools. We have in this country a certain number of manual training schools, where children are taught, in general, to use their hands and eyes, but of trade schools, pure and simple, where boys and girls may learn a profession by which they can later earn an honest living, we have very few. The Auchmuty schools, in New York, were exactly what is needed; and the New York Hebrews maintain, with the help of the Hirsch Fund, something of the same kind; but that is almost all; and the vast majority of children who must work with their hands to support themselves and those dependent upon them are obliged to pick up a rudimentary knowledge of some trade as apprentices, or helpers, struggling all the while against the influence of the unions, which oppose, by every means in their power, the training of future rivals to the selfish union members, and against the churlishness of the workmen themselves, who, as a rule, instead of being willing to impart to others the knowledge that they possess, guard with ridiculous jealousy any improved method or recipe that they may have become acquainted with. The result of this discrimination against the young and friendless, which is almost universal among workingmen, is that vast numbers of children of more than average natural capacity, unable to gain even the precarious foothold of apprenticeship in any trade, are forced to seek a living by their wits, taking up whatever presents itself. In many cases, they work up, through successive stages as errand-boys, wagon-drivers or clerks, to responsible positions, but a large portion of them, without regular employment or good example, drift into a condition of dishonest shiftlessness; and the interference of the public authority is needed, not only to keep the children of poor families from idleness and degradation, and put them in the way of becoming useful citizens, but to keep in a prosperous and progressive condition the trades on which so large a part of the community depends for existence, and which it is the policy of the unions to sacrifice to the selfish interests of their own members. In the industrial competition from which England now suffers so much, and is likely to suffer much more, and from which we shall, in our turn, suffer if we are not wise in time, an immense advantage has been derived by Continental manufacturers from the trade and technical schools which have been everywhere established. It is not many years, for example, since German manufactured articles were hardly known, outside of Germany, except as cheap, rough and clumsy things, which could not be sold to anybody but Germans. The first application of German science to business was, perhaps, in the manufacture of chemical products, and it was not long before the Germans led the world in this industry. The lesson was not lost, and in metallurgy, optical work, and the designing and weaving of textile fabrics, not only the managers of manufacturing establishments, but the operatives, began to be taught, not only the theory of their business, but the best and most improved manipulation; with the result that German silks are sold, it is said, even in Lyons; German brocades are sold in India, side by side with the native fabrics; German optical instruments are regarded, all over the world, as superior to any others; German ship-building, an industry of very recent creation, rivals that of any other country, and German hardware is rapidly supplanting that of Sheffield and Birmingham in the markets of the world. All this has been the result of a few years of education of young workingmen to understand and respond to the ideas of those more highly trained in the theory of the business in which both work together. In Prussia alone there are more than three hundred of these technical schools for workingmen, and in Belgium and Luxemburg, which closely follow German lead, they are, proportionally to the population, even more numerous. It would not have taken many years of this system to put Germany at the head of the industrial world, if it had not been for the fact that rival European nations were quick to see its advantages, and to take measures for profiting by German example. In France, a great number of trade schools, teaching nearly everything, from cabinet-making to weaving, were soon established, and have begun to produce good results; while little Switzerland already swarms with "*ateliers d'apprentissage*," or small trade schools, where children are practically taught weaving in silk, wool and linen, cotton-printing, embroidery, lace-making, carpentry and cabinet-work, wood-carving, ivory-carving, watch-making, jewellers' work, and the machinist's and electrician's trades. In the bright little city of Zurich alone there are between eighty and ninety such schools, and Geneva is said to be, in proportion to the population, still more amply provided; while even in the villages, wherever, as is very much the case throughout Switzerland, small manufacturing is done at home, technical instruction is within easy reach of all. It is not many years since this movement began on a comprehensive scale in Switzerland, yet the silk scarfs and handkerchiefs of Zurich, the so-called "Hamburg" embroideries and laces of Appenzell and St. Gallen, the watches, music-boxes and jewelry of Geneva and Neuchâtel, the wood-carvings of Brienz, Meiringen and the Haslithal, and the electrical and other machinery of Winterthur, go all over the world, carrying with them the best possible evidence of the intelligence, industry and trained skill and taste of the Swiss. Notwithstanding the high intellectual capacity of the Americans, they cannot expect to maintain their place in the industrial world unless they soon follow the example of their rivals. No doubt, industrial organization on a great scale has reached a higher point in this country than in any other, but the education of the individual workman has lagged behind, and the great and increasing demand of the markets of the world for what may be called intelligent perfection of execution is not easily satisfied here. Notwithstanding the ingenuity, for example, of our machinery for carving, architects do not find it easy, outside of the great cities, where workmen trained in the foreign schools are available, to get even tolerable wood carving executed from drawings; and the system of training of American youth must be profoundly modified before there would be any possibility of getting from American farm-houses anything resembling the clever, and often beautiful, original wood-carvings which are turned out by the cord from Swiss cottages. Although all schools involve expense, and trade schools, on account of the cost of their equipment, are more expensive than others, they are, perhaps, the best of all investments, for not only do they make citizens capable of supporting themselves and their families, and a part of the public burden besides, in place of paupers, but they develop, by the superiority of workmanship which they foster, the market which is the necessary complement of industry.

PROFESSOR JAMES C. BAYLES is doing a good work in urging the construction of pipe-conduits by which gas and water pipes can be carried through New York where they can be inspected and kept in repair. It is not long since some startling figures were published, showing the leakage of water from the mains in New York; and Professor Bayles

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

shows that the leakage of gas is as wasteful of money, and at least as injurious to health, as that of water. During the year 1900, the leakage of gas from the mains of the Consolidated Gas Company amounted, as nearly as it could be estimated, to eleven per cent of twenty-four thousand million cubic feet, or in round numbers, three thousand million cubic feet. At fifty cents per thousand feet, the value of the gas so wasted in one year was a million and a half dollars, while the damage caused by explosions in sewers and cellars, to say nothing of illness and discomfort directly caused by the leakage, would amount to a large additional sum. With pipes running in conduits, the leakage, of both gas and water, ought to be easily stopped, to the immense advantage of taxpayers and householders. The expense of a proper conduit would not be very large, and, in connection with the Rapid Transit tunnel one could be very easily and cheaply constructed. New York, owing to the rocky subsoil of a large portion of the island, is a less favorable place for underground workings than Boston; but the interests involved are so important that something will undoubtedly be done in this direction before long.

THE electrical experts of the National Board of Fire Underwriters have issued an interesting report on the fire hazards due to electrical installations, giving many illustrations, from actual occurrences, of the ways in which electrical currents under high pressure may set fires or do harm at a considerable distance. In one case of the kind a piece of wire tied at one end to a tree in the yard of a house had fallen over an electric-light wire carrying three thousand volts. To the same tree was attached a rope, used for a swing. The owner of the house happened to grasp the swing-rope and was instantly killed by the current transmitted to it by the loose wire. In another case, where transformers were used to convert a high-tension primary current into low-tension secondary currents for distribution, a branch of a tree was burned off by a primary wire, and fell across both the primary and secondary wires, thus establishing a direct connection between the two. In consequence of this, the high-tension current, at twenty-three hundred volts, was sent directly into three houses, setting them all on fire. In these instances, of course, the owners of the houses could not have prevented the damage; but there are many cases where those who use electrical devices are grossly ignorant or careless in their handling of them. A clerk in a store had occasion to use an incandescent lamp attached to an extension cord. A thunderstorm was passing, and the service was temporarily interrupted. The clerk, finding that there was no current in the lamp, dropped it on a pile of dry-goods without turning the key. A little later the current was turned on, and the lamp set fire to the goods, causing a loss of thirty-five thousand dollars. The popular notion that there is no heat in an incandescent lamp seems to lead to many fires. In another case, a lamp attached to a flexible cord was left lying on a wooden seat, which was set on fire in consequence. As there is a strong tendency among electrical engineers to increase the pressure of primary currents, seven or eight thousand volts being now used with nearly as much freedom as a twelve-hundred-volt current was a few years ago, it is more necessary than ever for the public to use intelligence as well as caution.

THE Technical Commission, appointed to investigate the condition of the public buildings of the city of Venice, and take the necessary steps for meeting any dangerous conditions, has ordered the immediate demolition of the tower of San Stefano, which appeared likely to fall. The tower, which is a tall and slender one, was built about five hundred and fifty years ago, and the decay of the masonry, inevitable in a slender shaft exposed on four sides to the weather, probably accounts for its condition; and the same may perhaps be said of some of the lofty and ill-cared-for houses in the Ghetto, which have also been condemned as unsafe. The Cathedral of St. Mark, the oldest, next to the Campanile, of all the great public buildings of Venice, is pronounced to be in good order; and the Ducal Palace does not show any defects beyond those noticed two or three years ago, and attributed to the weight of the books in the great library, most of which were, in consequence, removed. Of the buildings around the Piazza, only the Procuratie Vecchie, on the north side, adjoining the clock-tower, was found to be in any danger. It does not appear that any movement had actually taken place, but calculation showed that the slender shafts of the arcade which occupies the lower story were overloaded by the weight of the mosaics, marble statuary and other heavy goods stored in the upper stories by the merchants who occupy the building, and all such articles have been ordered to be removed.

THE newspapers seem to view the announcement of the formation of a great real-estate and building corporation, with a capital of sixty million dollars, with mingled feelings. In New York, corporations formed to hold and manage real-estate are comparatively new, and it is not many years since New York brokers found amusement in the quotations of Boston stocks of real-estate companies. It is true that the history of some of the early real-estate corporations of Boston has not been financially brilliant; but a few have been very successful, and there is no reason why good judgment and careful and economical management should not be as effective in securing income from money invested in buildings and land as from railroad property. Whether stocks based on real-estate security will bear expansion like railroad stocks is doubtful. It is quite possible, in times of prosperity, for the managers of a railway to use all the profits of the road in paying dividends, and then, by issuing new stock or bonds, representing nothing but "earning power," to enrich themselves at the expense of the public; but with securities based on real estate this is not so easy. A story used to be current among brokers about the Coney Island Railroad, which paid its entire cost from the profits of one day's operation, but which, having gone through the process of "capitalization in proportion to earning power," went through bankruptcy not long afterwards. With real-estate such a catastrophe would hardly be possible. City property very well situated may, perhaps, bring in seven or eight per cent on the valuation, but rarely more, and usually much less, than this; so that "earning power" is not likely to serve as a basis for inflation; and, as the assessors' books are open to the public, any one can compare the total amount of stock and bonds with the valuation. With this precaution, people who have money to invest might do much worse than select good trust stocks in city real-estate. Except in times of wild inflation, the value of such real-estate tends slowly, but constantly, to advance. It may take a hundred years for it to double in value, but, even if it should, the increase is equivalent to an annual dividend, deferred, it is true, but none the less sure, of one per cent on the investment.

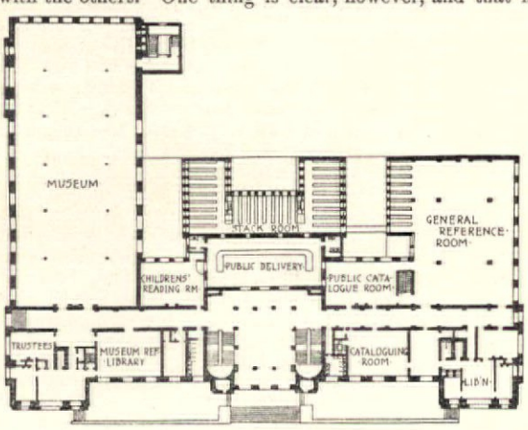
THE New York Rapid Transit Commission, which recently invited proposals for the construction of a submarine tunnel from the Battery, in Manhattan, to Atlantic Avenue, in Brooklyn, has received two offers. It was estimated by the Commission's engineers that the cost of such a tunnel would be about eight million dollars, and one of the bids received was exactly this sum. The other bid was from the Subway Construction Company, of which Mr. August Belmont is President, and proposed to do the same work for four million dollars. At the same time, Mr. Belmont made an informal offer to build a tunnel under Broadway, from Fourteenth Street to Forty-second Street, for one hundred thousand dollars. As the cost of a tunnel over this route, which is about a mile and a half long, would be about four million dollars, it is obvious that the corporation represented by Mr. Belmont is ready to invest a large sum of money in the two tunnels proposed, without return except such as can be derived from whatever control the Rapid Transit Commission may permit the builders to exercise over the tunnels after completion. It is generally believed that the Pennsylvania Railroad is interested in Mr. Belmont's company, and the fact that the proposed Forty-Second Street tunnel would carry passengers directly to the new station of the railroad gives some ground for the belief, although it is not very evident how the Pennsylvania road could profit much from a slight advantage in conveniences for bringing passengers to its station.

THE Cercle Littéraire Franco-Américain invites sculptors of all nations to submit models for a monument to be erected at Newport, R. I., in memory of Admiral de Ternay and the five thousand Frenchmen whom he brought with him to assist the Americans in their war of independence. The designs must be submitted on or before October 1 next. Details of the competition may be obtained by addressing the De Ternay Monument Committee, 138 West Thirty-fourth Street, New York.

LIBRARIES IN THE UNITED STATES.[1] — III.

TOWN LIBRARIES. — DIVISION I.

THE four buildings chosen to illustrate the planning of large town libraries are very unlike each other. In each case the motive of the design has been a different one. The first built, the one at Boston, is much larger than either of the others, and so is difficult to compare with the others. One thing is clear, however, and that is the



First Floor: Public Library, Milwaukee, Wis. Messrs. Ferry & Clas, Architects.

growth of the free-access policy and its great effect upon the plan. Not only is it necessary for the general reading-room to have, as in the Bates Hall at Boston, the walls shelved for books of reference, but the borrower must also be allowed shelves to select from; and the plan adopted at Newark of placing open-shelf rooms of ample area either side of the delivery-hall, where thousands of books may be stacked, is an excellent one. At Providence a different method is adopted. The shelves are placed between the entrance-hall and the delivery-space. This is not so good, the control being inadequate. The positions of the stack-rooms in three out of the four plans are in the rear of the main building. In Newark they are nearly isolated — a great advantage should fire occur in the main building.

The public-libraries at Chicago, Milwaukee [see plan above] and Jersey City are all particularly worthy of study if space permitted.

BOSTON LIBRARY.

The Boston Library [2] is, perhaps, the best known of all the American libraries. It was really the first great monumental one of the present library movement, and, architecturally, it is of very high merit, and its influence is much in evidence in many of the very recent ones. Its plan is not good from the librarian's point-of-view, but the librarians know now pretty well what is wanted, whereas, 15 years ago they were doubtful and uncertain, and library science has moved very rapidly, indeed, since, so that to-day obviously recent planning should be infinitely better than that done early in the movement. It was in 1887 that the trustees of the library decided upon the architects, and the building was started in November, 1888, but it was not until 1895 that it was opened to the public. The site is nearly square, and faces streets on three of the four sides. Its frontage is 225 feet and the depth 227 feet. The great central courtyard is a magnificent feature with its colonnade on the three sides, especially as seen from the half-landing of the great stairway leading to the main floor of the library.

In many ways the present plan varies from that originally settled upon and even built, rooms having been reallotted, and the delivery-hall quite rearranged. The building is placed on a raised platform, and the main entrance-hall is approached from three large arched openings in the centre of the principal façade. This first floor is occupied by the newspaper-room, 45′ x 81′, and two rooms for periodicals, each 34′ x 40′, all to the right of the entrance-hall. The newspaper-room has a row of five columns down its centre, and on the square bases of these, to a height of 4 feet 7 inches from the floor, are placed sloping newspaper-racks 2 feet 8 inches wide, four to each column; and also between them are placed upright stands 7 feet long, each capable of holding 28 newspapers, 14 on each side. Along the walls below the window-sills are the newspaper-desks. Altogether provision is made for 325 newspapers. Seven large tables are provided, each 12′ x 36′, seating 4 on each side. Chairs are also provided in rows of 6, placed back to back, thus largely increasing the seating accommodation. The room is lighted on two sides, the sills being 8 feet above the floor. The first periodical room is used as a reference-room, and in it are stored the recent numbers in cases along the walls and in a gallery around three sides of the room. It is seated for 32 readers at 4 tables. The other periodical room is used for the readers of current numbers, and in it more than 600 are displayed on cases placed against the walls, as well as in rests down the centres of the 6 tables. It is seated for 48 readers.

[1] A paper by Sidney K. Greenslade [*A.*], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal* of the Society. Continued from No. 1387, page 30.

[2] See plan, *Journal* R. I. B. A. Vol. VI, page 218.

Nearly the whole of the other rooms on this floor are used for administrative purposes. The catalogue and shelf department is 45′ x 81′, and adjoining is the receiving and ordering department. In the left-hand far corner of the building is placed the stack, returning half round two sides of the courtyard. It is the second floor of the stack at this level. In the opposite corner is placed the bindery, and adjacent to it the printing-department. There are besides rooms for newspaper-files, 32′ x 36′, and the branch department, 17′ x 68′ — both adjacent to the stack; also a reception-room, cloak-room, public telephone-room and public lavatories. In a mazzanine floor (level with the third floor of stack) are galleries around the periodical, reference, and newspaper rooms, connecting with periodical stack-room, 23′ x 34′, and in these galleries are cases with drawers in which are placed the current numbers of the periodicals before being bound. Ample luncheon and locker rooms are provided for the staff on this floor between the stack and the catalogue department. The newspaper-files room is also provided with galleries at this level. The stack at its third-floor level is of a greater area than either of the other floors. It is 36′ x 116′ one way and 40′ x 63′ the other; unfortunately at this floor-level it is inadequately lighted.

The great feature of the library is the reference reading-room, called the Bates Hall, which occupies the whole of the front on the second floor. Its two ends are apsidal and separated from the main central portion by screens, partially open, used as bookshelves. In the right-hand, or northern, apse are shelved the maps, dictionaries, encyclopædias, etc., and the southern one is used as the public card-catalogue room, which is also approached from the lending delivery-hall. The total length of the Bates Hall from end to end is 217′ x 40′ wide, and the crown of the barrel ceiling is 50 feet from the floor. It is lighted by 13 large semicircular-headed windows on the front and 2 at each of the ends, the sills being kept well above the bookshelves below them. It accommodates 264 readers at 33 tables. There are 2 rows of tables, each 10′ x 3′ 6″ and 30 inches high, provided with 8 chairs each.

Between each of the pilasters are fixed oak bookshelves 11 feet 9 inches wide, standing on a marble plinth 1 foot 3½ inches high; the height of the space for books is 5 feet, and the total height of case to top of cornice is 7 feet 9½ inches; horizontally they are divided into 3 divisions. In these cases around the room are placed about 8,000 books of reference. The attendant's desk is placed in the centre of the room opposite the main entrance; here books are changed and returned for use in the hall only. The books are brought from the stack on trucks with rubber-covered wheels.

The lending delivery-hall is to the right as one approaches from the main stairs. It is 33′ x 64′, and is fitted amply with chairs, tables, bulletin-boards, and shelves with recent books. Between this delivery-hall and the stack is the issue-department. The most noticeable feature here is the circle of pneumatic tubes to the left, through which the application slips are sent to all parts of the book-stack. An apparatus has been installed in the issue-department novel to library use. This is a "pick-up carrier." Its purpose is to transport the various slips between 4 points in the issue-department doing business with one another — the issue and return desks, the record-trays, and the pneumatic terminals.

At the stack-end of the issue-department are the book-elevators, and the book-carrier to these is a cable railway operated by electricity. Each story of the stack is equipped with an 8-inch track running its entire length. Each track has 3 stations, placed at convenient intervals, and each station has its own carriage — a low wire basket capable of containing all but the largest books. Girls are employed as "runners" on each floor to carry the books called for to the baskets. When the basket is loaded it is pushed from the station to the main track, where it grips the cable and is carried towards the issue department at the rate of 500 feet a minute. As the stack is in 6 stories, only one of which is on a level with the opening to the issue departments, 5 miniature elevators are provided — one for each of the stack stories above or below the level of the window. When the basket approaches it automatically slips the cable, and its speed having been gradually slackened it slides upon the elevator. If the elevator is "busy" the basket is held until its turn arrives. If it is not "busy" the shock releases a pin, and the motor below hoists or lowers it, as the case may be, to the window. The librarian's room with its private office is placed adjacent to the issue-department. The children's-rooms balance the issue-department on the north side; the larger is 34′ x 65′ and the other 37′ x 40′. The large room is fitted with 7 elliptical tables 7′ x 5′ and 2 feet 3 inches high, with 8 chairs around each. The shelving accommodation in the 2 rooms is for 8,000 volumes. In the small room are 6 tables 3 feet 6 inches wide by 12 feet long, with 12 chairs to each. From this room the lecture-hall, 40′ x 86′, can be reached. The patent-room, 36′ x 42′, adjoins the stack-room. The top, or third, floor is wholly arranged for special libraries. Alcoves — about 12 feet 6 inch centres — are placed around the whole of the outer walls. They have galleries around them with shelving. In each alcove is placed a table seating 8 readers, arranged next the windows which look into the courtyards, and altogether there are 29 alcoves. There is also a specially fitted room, 27′ x 51′, for music, and 2 rooms, each 35′ x 66′, one used for a special collection and the other as a fine-arts room.

It is a little unfair, perhaps, to criticise this plan, because of the rapid developments of library planning since its creation. Still, there are many points in it that are not good, particularly the position of the fine reference reading-room in relation to the stack-room

the cramped position of the delivery-hall, and the unfortunate shape and position of the stack-room, necessitating the use of elaborate mechanical arrangements for carrying the books.

The cost of the building was £473,000, and the shelving capacity at present is for 750,000 volumes. The architects were Messrs. McKim, Mead & White.

NEWARK PUBLIC LIBRARY.

The Public Library at Newark, N. J., was only completed and opened on March 14, 1901. It is evident that a deal of thought has been spent in its arrangement and planning. A great point has been made of "free access" to the books, both outside and inside the stack. The site is an open one with no curtailments. The main building has a frontage of 103 feet and a depth of 157 feet. Connecting this building to the 2 stacks in the rear is a small block about 30′ x 30′. Each stack-room is 60′ x 39′. At present only one is complete — the left one being only built at the basement level — and contains the engines, boilers, and the electric-plant. The general arrangement of the rooms on each floor is as follows: —

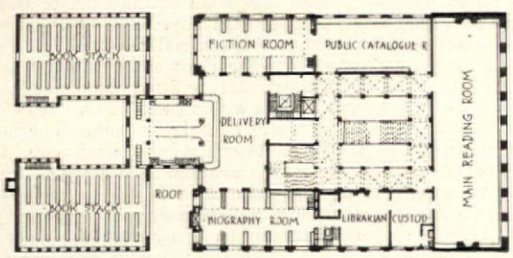
On the first floor are placed the newspaper reading-room, children's room, public bicycle check-room, public toilets, administrative rooms (including stock-room, binding, packing-room), delivery-station room, repair-room, and, to the rear, the stack-room and boiler-rooms.

On the main floor is the general reading-room, occupying the whole of the front of the building, as at Boston. The delivery-room is in the rear, opposite the landing of main stairs, and on either side of it are the 2 open-shelf rooms for fiction and biography. The delivery-room, with its counter and working space, occupies the connecting-block between the main building and the stack-rooms. The public catalogue-room and the librarian's public room are placed at the sides, between the general reading and the open-shelf rooms.

On the third floor are the reference-room, patents-room, art-book room, cataloguing-room, various staff-rooms, and 2 special study-rooms near the stack rooms.

The fourth floor consists of a lecture-room, the museum, and art-gallery.

The children's room, 29′ x 32′ and 23′ x 30′, is L-shaped in plan, and occupies the front corner of main building — easily accessible



Main Floor: Public Library, Newark, N. J. Messrs. Rankin & Kellogg, Architects.

from the street. Directly opposite the entrance is placed the attendants' enclosure, 16′ x 10′, with counter all around, 2 feet 1 inch wide and 2 feet 6 inches high, fitted inside with shelves and with a gate at the back. In the space between the entrance and counter, divisions are placed to direct the ingoing and outgoing readers. The ways are 1 foot 3½ inches clear. It does not answer well, as the division is not carried to the floor, and children slip out. There are 6 tables, 3′ x 5′ x 2′ 4″ high, seating 10 readers each — decidedly too many to a table. In the portion of room directly to the left of the entrance 2 steel stacks are placed, 1 foot 4½ inches wide and 9 feet long, and of the same height (5 feet 2 inches) as the steel shelving placed all around the walls of the room. These isolated stacks form small alcoves, which are used as the reference portions of the room. The shelving capacity of the room is for 8,000 volumes.

The newspaper reading-room occupies an exactly similar position as the children's room to the right. It can be approached either from the main entrance or the side. Adjoining it is the men's lavatory. The binding and repair rooms are placed adjoining in the left-hand far corner next stack-room, one being 24′ x 38′ and the other 19′ x 20′. The delivery-station room, 28′ x 30′, is placed between the stack-rooms and the main building. From this room small lifts run to all the floors of stack. The floor of this room is some feet above the level of the road outside, so that when the delivery-wagon backs up the cases of books for the stations can easily be shifted onto it. The sizes of the boxes for the books are 1′ x 1′ x 3′ 3″. In the centre of the room is a long table, 2 feet wide and 3 feet high, with cork-linoleum top, for taking these boxes; and, adjoining, a table, 12′ x 3′, with 3 tapered divisions 15 inches high, with table-top 2 feet 9 inches from floor, in which the books for the separate boxes are checked and dispatched. The first floor of stack-rooms is level with this floor of main building.

Ascending the main staircase to the second floor, one enters through a short corridor directly into the delivery-room, which is 28 feet 6 inches deep by 48 feet wide. The open-shelf rooms on either side, each 24′ x 51′, are fitted with steel stacks for books of fiction and biography. To get to these rooms the reader has to pass through one of the turnstiles in the delivery-counter, which is divided into 3 — the central portion is 18 feet 6 inches wide, and the other counters for changing and registration on either side are each 7 feet 6 inches, and between are the turnstiles for entering and leaving. There are 2 turnstiles to each opening, each 15 inches wide. This counter necessitates 3 attendants at least — sometimes 4. The openings between the columns to these rooms have large fixed seats between them, so preventing access from the delivery-room to the books without passing the turnstiles. The steel stacks in them are somewhat differently arranged from that shown on the plan. There is only 1 row to each room: they are 12 feet long and 8 feet 6 inches apart, and are placed 18 inches from the wall, so there is ample room for the circulation of readers choosing books. A gallery with a glass floor is fixed over, so that another floor of stacks may be erected when necessary. Between the delivery-counter and the stack-room is the delivery working space, 28′ x 36′. In the 2 enclosed spaces either side of gangway leading to the stack-rooms a great deal of the work of the library is done. Rather inconveniently placed in relation to the delivery-room is the public catalogue-room. It is 23′ x 51′, and in it the card catalogue is arranged in desks around the room and down its centre, instead of in the usual upright stands with small drawers: it therefore necessitates a great deal of space for its display.

The main reading-room is placed to the front and occupies the whole width of the building; it is 29′ x 95′. It is entered from the gallery around the well of the entrance-hall at 2 points. Like the Bates reading-room at the Boston Library, it is lighted from the front by a series of large windows. The room is oak-panelled to the height of the window-sills, which is 8 feet. The dado-moulding is 3 feet 10½ inches high, and between the bays above this moulding are placed vertical cases for the periodicals, 1 foot 6 inches high. There is no book-shelving. It is fitted with 15 tables, each 3′ 4″ x 9′ 9″, placed in 2 rows, and with 9 armchairs to each, and 1 round table 6 feet diameter, accommodating 140 readers altogether. The attendant's desk is placed next the public check-room. The height of the rooms of this second floor is 20 feet.

The reference-rooms on the third floor are particularly well arranged. The assistant's desk is placed just opposite the entrance, and all readers have to pass it, the doors which originally opened from the patents-room and art-book room to the gallery surrounding the staircase-well having been closed. The top floor of the stack is level with this floor, and is quite open to it and reserved for reference-books. A locked gate is placed at the stairs, so that the lower portions of the stack-rooms cannot be reached. Three special study-rooms, 10′ x 13′, are placed adjacent over the working-space on the floor below.

The reference-room consists of 2 rooms 24′ x 56′ and 28′ 6″ x 50′. They are both divided into alcoves by steel stacks, which are 7 feet high and 9 feet long, placed at 10 feet centres; in each alcove is a table 2′ 3″ x 3′, with seats for 4 readers.

In the patents-room (23′ x 51′)the stacks, which are 21 inches wide by 6 feet long, are arranged in a similar manner, but against the inner wall, and the 4 tables, each 5′ x 3′ 3″, accommodating 16 readers altogether, are placed at the piers between the windows. Through the patents-room, the art-room, 29′ x 42′, is reached. Here 2 large leather-covered and padded rests for large books are placed in the centre of the room, 3′ 4½″ x 5′ 3″ wide and 7 feet 6 inches long, divided into 3 divisions on each side. The front portion of the room is divided into 4 alcoves by wider stacks than used in the other rooms, the lower portion of each being 4 feet wide by 3 feet high, and the upper portion 2 feet wide by 4 feet high.

The stack-room is shelved to take 33,600 volumes on each floor, and there are six floors, the first being level with the first floor, the third with main floor, and the sixth with reference-floor, providing a total shelving-capacity for over 200,000 volumes. The stacks are 12 feet long, divided by a centre passage-way 4 feet wide, with side passage-ways 3 feet wide. The uprights are of steel, the shaped ends and rests for shelves are of copper, the shelves are of wood, and the floors of glass. A lavatory-basin is placed at the end of each central gangway, and at each corner of the stack-room on each floor dust-flues are provided. They are 12″ x 12″, with galvanized-iron shutters; the flue is covered with wire-netting to prevent books from falling, and the particles of dust are sucked down out of the building by fans.

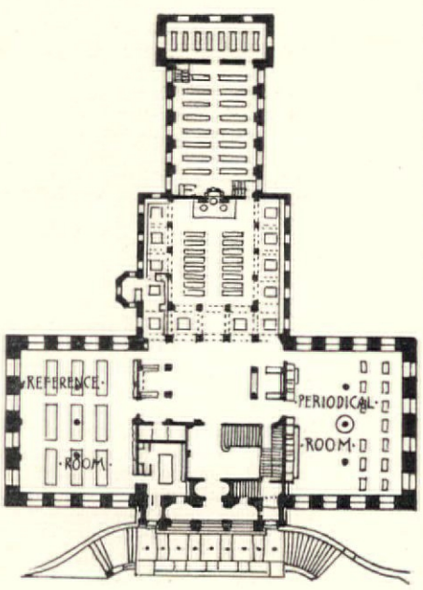
All the windows of the stack-room are fixed, to prevent dust getting in, and on the outside for cleaning purposes 2 iron galleries are placed at the third and fifth stories; the windows placed between each row of stacks have their sills only 12 inches from the floor, so well lighting the bottom shelves of books. On each floor of the stack-room is a telephone, and automatic-electric book-lifts are placed just outside, in a gallery overlooking and open to the working delivery-space. Its position here is necessary, for when the second stack-room is built the lifts will be common to both stacks.

The upper floor does not call for comment. There are some excellent points in the planning of this building. The arrangements for the open-shelf rooms, delivery-hall, work delivery-space and stack-rooms are very good indeed, and the approach to these rooms from the main entrance is very direct. The cost of the building was £60,000, and it was designed by Messrs. Rankin & Kellogg, of Philadelphia.

PROVIDENCE PUBLIC LIBRARY BUILDING.

The Public Library Building, Providence, R. I., was completed and occupied in March, 1900. A competition limited to the architects of Providence resulted in Professor W. R. Ware selecting the plans of

Messrs. Stone, Carpenter & Willson. Owing to successive liberal gifts these were much modified and enlarged, and it was not until 1896 that building-operations were commenced. The site is quite isolated and nearly 200 feet square. The building itself, consisting of the main block, 139′ x 58′, and the stack-building at the back, 108 feet long and of varying widths, covers an area of more than 11,600 square feet. The boiler-house is placed outside the building in the rear to the right. In the planning of the Providence Library it is evident that the librarian's point-of-view was well considered, and his advice invited in the attempt to solve a problem which had not been altogether successfully coped with. The Providence plan is, therefore, an interesting one, coming, as it does, between the Boston and Newark libraries in date.



First Floor: Public Library, Providence, R. I. Messrs. Stone, Carpenter & Willson, Architects.

The basement, which, owing to the fall of the ground from front to rear, is particularly well lighted, contains more stack-room accommodation than any of the floors above, the whole of the space below the delivery-room being occupied. The men's staff-room, fitted with steel lockers and with lavatories adjoining, men's and women's public lavatories, packing-room, supply-room, bindery, are all arranged in the front block. In the rear to the right is a bicycle-yard 25′ x 34′, fitted up on each side with holders, with an entrance to the building and to the back streets.

The first floor includes the 3 rooms which every visitor needs to find directly accessible to him, the delivery-room (80′ x 50′), in immediate contact with the stack and the 2 main reading-rooms; the periodical-room (41′ x 50′); and the reference-room (41′ x 50′), with small map-room (16′ x 12′). These 3 rooms together comprise an area of more than 7,800 square feet.

On the second floor are placed the lecture-hall, 37′ 4″ x 40′ 10″ (seating capacity 110 persons), the children's department occupying 2 interconnecting rooms, one 24′ 6″ x 40′ 10″ and the other 18′ 3″ x 18′ 10″. The standard library is a feature of this library; it has 2 interconnecting rooms (one 12′ x 39′, and the other 19′ 6″ x 20′). There are also 4 interconnecting administrative-rooms for the librarian, the auditor, records and trustees. All these are in the main building. Behind, over the delivery-room, is a large educational study-room, 27′ 6″ x 36′, and beyond is the fourth stack story, 27′ 6″ x 43′ 10″, with the women's staff-room, 12′ x 20′, and their toilet-room adjoining.

The third story is preëminently "the special-library floor," providing laboratory facilities in connection with works on art, industrial literature and other departments which are necessary for a manufacturing centre. There are 2 reading-rooms, the industrial 16′ x 18′, and the medical 16′ x 27′ 6″, with their stack-rooms for patent literature and medical literature, each 21′ 4″ x 39′, adjoining. There is also a room 58′ x 43′ 6″ divided into alcoves for special libraries on art, music (including a collection of musical scores for circulation), historical collections, etc. The whole of these rooms are top-lighted, which is unfortunate, the heat in the summer months being very great indeed. This third floor is connected with the sixth floor of stack, which is also top-lighted here, and beyond the stack are placed 2 study-rooms over the 2 below on the fifth floor of stack. Two of these study-rooms are 12′ 6″ x 15′, and 2 12′ 6″ x 18′ 10″. The stack building (the central one of 3 to be erected at some time in the future) contains besides the stack and the 4 study-rooms at the back, etc., already described, the greater portion of the delivery-room, 48′ x 48′, which projects into this part of the building, so that an important point is thereby secured — the delivery-counter is placed in an ideally favorable position, with stack above and stack below as well as stack beyond. In what is really the inner main hall are the registration-desk and information-office, and between this hall and the delivery-room beyond are placed, between the piers, the cases containing the new books and books of interest on special subjects engaging the public attention at the time. The delivery-space proper is 27 feet 6 inches wide by 36 feet long, and is fitted with seating on each side similar to that shown on plan. Beyond is the delivery-counter, about 14 feet wide and projecting 5 feet from the wall; there is room for 3 attendants behind it, 2 at the counter and one behind in the recess at the opening connecting with stack-rooms. Here is placed a shelf, and books are delivered direct from second and third floors. From the first, fourth, fifth, and sixth floors, small elevators are used. The level of the second floor of stack above delivery-room floor is 3 feet 7 inches.

The ceiling to the two wings and to the two side approaches to the delivery-room being much lower than those over the other portions, light is obtained over them, so ranges of lunette-openings are possible by this means on three sides. Besides small windows, the wings also have skylights in each bay (see plan). In the right wing are placed the shelf-lists, which are type-written and bound, and in the left wing the card-catalogue, where a large table is provided as well as a shelf-ledge all around the walls for standing to.

The cataloguing-room is really cut out of the delivery-room, and no doubt when an enlargement of the library takes place more room will be provided for it; its bay for small reference library for official use is a pleasing feature.

The reference-room (41′ x 50′ and 16 feet 4 inches high) is well lighted on its three sides, the sills of the windows being above shelves round the room: these are 5 feet 3 inches high. Those to wall in which entrance occurs are 7 feet high. It is fitted with 6 tables, 12 feet long and 3 feet 6 inches wide, seating 5 readers either side, a total of 90 readers. The attendant's desk is placed in the right-hand corner next cataloguing-room. The small map-room off this room is conveniently situated.

The periodical-room, of the same dimensions as the reference-room, differs in arrangement from it. The far portion of the room is fitted with 2 rows of 6 small tables, 2′ x 4′, with 4 chairs to each; one large table is reserved for women. The room is shelved in a similar way to the reference-room. The inner wall is fitted with cases containing drawers for the current numbers of periodicals, where they are kept previous to binding. In the centre of the room, arranged around a column, is placed a periodical-stand containing spaces for just 200. The lower portion to a height of 4 feet is circular, the remainder being octagonal. At a height of 3 feet 2½ inches it has a 12-inch sloping rest. The lower portion has 12 divisions in its height, the first being 7½ inches off floor, and the upper portion 15 divisions and is 2 feet 7½ inches high.

The stack-room at this level consists of a front portion 27 feet 6 inches wide by 43 feet 10 inches long, and the end building placed longwise to it 12′ 6″ x 34′ 6″. Each floor of the stack is 7 feet 1 inch from floor to floor. The whole of the fittings of the stack are of steel, including the shelving. The gangways are of glass, 2 feet wide, with a 3-inch air-space each side between glass and shelf-line, making space between shelves 2 feet 6 inches. The width of each stack is 1 foot 10 inches and the ends are solid. The shelves are of steel, rounded front and back, enamelled, and are 10 inches wide. The walls are lined with 1-inch polished white marble, in slabs of one height, 6 feet 7 inches and 2 feet 10 inches wide. The 6-inch skirting is of polished black marble. The stacks are very well arranged, well-lighted, and not over-crowded, the only ill-lighted portion being the central space of the room below the delivery-hall.

A special provision has been made for dusting books. On every stack-floor a small closet is arranged for this purpose at one end, and all dust shaken from them into a hopper is drawn by a 1½-horse-power fan, placed just below the roof and discharging the dust-laden air by a 6-inch pipe passing through it. There are 2 staircases between the floors of stacks, one at each end.

The room set apart for the standard library is a well-proportioned room with a barrel ceiling. It has fixed seating on two sides, and book-shelves to a height of 5 feet 3 inches on the other sides. The assistant-librarian's desk is placed in this room and several small tables 1 foot 8 inches high and 18 inches diameter are arranged near the seating. The special reading-room adjoining is 18′ 6″ x 20′, also fitted with shelving.

The children's room (24′ 6″ x 40′ 10″) is fitted with tables to accommodate 48 readers, 3 each 3′ 6″ x 9′ 9″ for 8 readers, and 2 each 3′ x 12′ long for 12 readers; these long tables are only 2 feet high. The attendant's desk is at the entrance, and a small work-table is placed in the centre of the room. The central column has framed around it panels for exhibiting pictures. Shelving is placed around the walls, 4 feet high to window-sills, and one shelf higher between them. The card-catalogue is placed in the far corner of the room, with table for reference. The adjoining room is used as a class-room for the study of special subjects. Cupboards to a height of 3 feet with a 12-inch ledge are arranged around the walls, and above to a total height of 7 feet the walls are covered with colored linen, having brass rods to which photographs and drawings may be hung. The first rod is 1 foot 5 inches high, then 12 inches, then 6 inches and 6 inches, 4 rods altogether. The room has one large table, 4′ x 9′, with 8 stools to it. Off this room is a small lavatory with basin only; other toilet accommodation is provided in the basement.

The cost was about £53,000, and the shelving capacity is for 225,000 volumes. Generally this is a very interesting building. A serious attempt has been made to meet the new requirements of the "free access" policy, and to a large extent it has been successful.

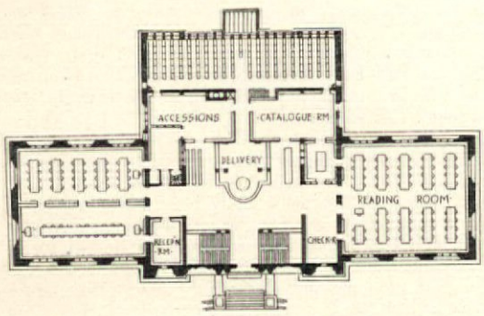
WASHINGTON PUBLIC LIBRARY, WASHINGTON, D. C.

The design for the Washington Public Library Building, Washington, D. C., was the result of practically an open competition. Ten well-known library architects were invited to compete, each receiving a honorarium of £50. Other architects were also allowed to send in schemes, and the result was that the plans of Messrs. Ackerman & Ross, of New York (not an invited firm), were selected. The programme of the competition was issued in May, 1899, and in August, 1900, building-operations commenced, after the plans had

been very much revised. The conditions of the competition were very carefully drawn up, and the cost was limited to £50,000, but this was overstepped considerably, the total estimated cost being £70,000. Altogether the building covers over 17,000 square feet. Its frontage is 220 feet, with 60 feet return ends, and the greatest depth through centre is 111 feet 6 inches where the stack-room occurs. The building consists of basement and 2 floors above. The basement (12 feet floor to floor) is but partly below the ground-level and is well lighted. The entrance to it is placed under the approach of the main entrance above, the vestibule being 20′ x 15′, from which the stairs on either side lead to the main vestibule above. Entered from half-landings, placed 6 steps up, is arranged the lavatory accommodation for men and women, the latter to the right and the former to the left. Beyond the vestibule is a large space for bicycles. One room only — that occupying the west wing — is intended for real library use; it is 58′ 6″ x 50′, and will ultimately become the children's reading-room when the demand for juvenile accommodation outgrows the space provided on the first floor for this purpose, or when the children's room on the first floor is needed for the open-shelf accommodation. The east wing, of the same dimensions, is devoted to the staff lunch-room (20′ x 24′), fitted with lockers, with a kitchen and pantry adjacent, store-rooms, and rooms for the caretaker, house-cleaners, and scrub-women. The boiler-room (52′ 6″ x 32′) extends down to a sub-basement (21 feet 6 inches) below the first-floor level, therefore 9 feet 6 inches below the basement floor, and is placed right in the centre of the building. Behind it are placed the packing and delivery room (34′ x 22′) and the station-delivery (15′ x 25′), into which delivery-wagons can back, having a staircase and lift to the stack-room. The room for binding and repairs (34′ x 22′) occupies the other corner. Near it is the attendants' entrance.

The first-floor entrance is approached by a wide flight of 16 steps. From the vestibule the delivery-hall is entered, and directly opposite the entrance is placed the delivery-counter. Not including the staircases either side of the vestibule, the space devoted to the public and the officials for delivery-work is about 50′ x 40′.

The delivery-counter has a frontage of 60 feet to the delivery-hall and the card-catalogue is placed to the right, and seats for the waiting borrowers to the left. At the back of the counter (beyond the



First Floor: Public Library, Washington, D. C. Messrs. Ackerman & Ross, Architects.

corridor) is the stack-room, which is 22′ 6″ x 83′, occupying the whole north end of the central block and extending up through both first and second stories, containing altogether 5 floors of 7 feet each in height, and having a shelving capacity of about 264 500 volumes. There are altogether 21 rows of stacks, 18 feet long on each floor, with light between each row, and the upper story is top-lighted. The floors are to be of white marble or glass.

On the west side of the corridor leading to the stack-room the accession-room and librarian's room are placed, while on the east side the catalogue-room and small reference-room occupy similar positions.

In the east wing is the general reading-room (58′ 6″ x 50′), arranged with 9 tables seating 8 readers each, and one seating 4, also an attendant's desk. Around the whole of the walls of the room shelves are provided to a height of 5 feet, which will contain 7,770 books. This room is exceptionally well lighted on three sides by 8 fine windows.

At present the west wing, of similar dimensions, is divided into two by a temporary partition, half arranged as the children's room, with 5 tables seating 8 each, with shelving around for 5,500 books, and the other half arranged as an open-shelf room, also shelved for 5,500, with one long central table seating 20 readers. In time, as before stated, the whole of this wing will be devoted to the open-shelf room, and the children will occupy the large room below it. The other rooms to be noted on this floor are the check-room and reception-room, on either side of the staircases and adjacent to the entrance.

On the second floor is the memorial hall (50′ x 25′) placed centrally to the front. To the right, over the reading-room below, is the newspaper and periodical room, of the same dimensions, and fitted similarly; to the left the lecture-hall occupies a similar position. Four special study-rooms, each 20′ x 14′, are placed conveniently near the stack-room.

[To be continued.]

NOTES ON THE LATE PARIS SALONS.

IT is sad to think of our loss in the death of M. Benjamin-Constant. Without doubt the best portraits in the *Salons* are his work; and now, as regards this our world, he has gone down into silence. But as a lady *en passant* remarked, "he has not been fortunate in his models"; nevertheless he has turned out a grand portrait in his "Lord ——," and if M. Blowitz's is not that of an Apollo or of a fine gentleman it is not the painter's fault. It is instinct with life. It is curious to note the departure in Constant's work from the old manner of a thick *impasto*, and the adoption of a more broken up handling. His coloring too has altered since the days of "Theodora," and for the better.

It will save trouble in writing these notes and in reading them if I put the initials S. for the old *Salon* and B. A. for the new.

So many artists at the latter seem to have fallen off, but a few keep up their reputations. Mr. Harrison (B. A.) has exquisite moonlight and sunset effects of water and sky — iridiscent shimmering, purple-green sea flowing in over a flat sandy shore. M. Lerolle's "Bergère" is charming, though he has left that beautiful gray, silvery tone of his "S. Geneviève." Noteworthy too are M. Dagnan's (B. A.) "Bretonne" and portrait of an elderly lady — they are refreshing simplicities perfectly rendered and of a far higher standard and purer style than the large pictures we have seen of late with accessories of red curtains and electricity. M. Detaille (S.) has achieved a great success in his two large decorations for the Paris Hôtel de Ville, especially the "Reception by the Municipality of the Troops returned from Poland" in 1807. It is full of curious uniforms and costumes, singing-ladies and harpists, which, with the obsequious Minister stepping forward to decorate an "eagle," form a spirited picture of that time of enthusiasm for all things military. Both pictures are instinct with life and beautiful in color; may their fate not be that of M. Clairin's in the Halles au Blé or of poor Baudry's at the Opéra — practical destruction. It is a satire upon conscientiousness that Baudry, thinking it honest and just to put of his best into the Opéra pictures, would not ease the work by having help; not only was his health ruined, but his other work was but little, for want of time. And now? His devotion is rewarded by blackened pictures which may justly make people ask why he had so great a reputation? But that his contemporaries were right is proved by the few masterpieces of portraiture which remain. Does it not seem a folly to commission great artists to decorate buildings and then let gas and smoke destroy their work? The Beaux Arts is best in its decorative-art department, jewelry (by such a master as M. Boutet de Monvel!), glass and faïence, and we may see as a fact that it is not moonshine to assert that, given the public to buy expressive artistic nothings, there is no fear of the production of such work failing — labor is expensive in these days, and artistic work is slow, but genuine artists exist. M. Maignan's Eve called "Seduction" (S.), is a new, or rather a revived, reading of the old subject, for I remember once seeing a thirteenth-century MS. with a similar serpent standing up on his long, coiled-up tail. That such painters as MM. Olive, Montenard, Allan Hitchcock and Matignon and Damoye should be interesting need scarcely be stated, but we miss so many whom we look for with great expectation, for instance, M. Jean Béraud is absent, and M. de Richemont is only represented by a small "Matérnite" (S.), charming as far as it goes, and M. Carrière, by some studies in monochrome. They are therefore disappointing shows. M. Aimé Moreau has hit upon a new subject: some blacks carrying a dead lioness (or lion) through the jungle to a canoe, called "Au Tableau" (B. A.). It is a powerful work and excellent in tone.

Another decorative panel (for the new Sorbonne) "Un Cours de theologie: — les étudiants au XIV^e^ Siècle," is very strong in color; and like the same artist's work at the Opéra Comique, exceedingly picturesque. Remembering that Dante sang his "*Divine Comedy*" to the students in the precincts of the old University over against the ancient church of S. Julien-le-pauvre, one imagines from the likeness to the poet at Florence, that he was the reciter — but if so, why *theologie*?

Taking the two exhibitions *en masse*, we must admit that they are dull and vastly inferior to those of former years; and it is a question whether the London R. A. show is not in many ways superior.

S. Beale.

ELECTRICITY A MATERIAL SUBSTANCE.

THE generation of "electricity" consists in splitting off an electron from the atom. The electron then produces a stress in the ether similar to that due to a "negatively" charged body. The remainder of the atom acts as a "positively" charged body, though we do not know as yet whether the positive charge is due to a special positive electron or not. If it is, we have not yet succeeded in isolating the positive electron, but it is supposed to be about ten times heavier than the negative electron. In any case we have here an elementary negative charge of about one ten-billionth of the absolute unit and an elementary positive charge of the same amount. These elementary charges attract each other and repel similar charges. They can associate with clusters of neutral particles. A negative electron thus associated with ordinary matters becomes a "negative ion," and a positive electron becomes a "positive ion." Conduction consists in the wandering of positive ions down the potential gradient, and of negative ions up the potential gradient.

This wandering can take place in metals. It then produces heat by collision with the molecules of the metal, and a magnetic field by the motion of the charges. In a liquid, the energy of motion is consumed in the splitting up, or "ionization," of neutral molecules. Every current of heat is associated with a transportation of ions, and here the whole field of thermo-electricity is entered. In the vacuum-tube, ions move with less restraint. Negative electrons are shot off from the cathode with the velocity of light, or something very nearly approaching it, and where they strike upon a solid they produce explosive ether-waves of remarkable penetrating power which are known as Roentgen rays. Where they hit gaseous particles they ionize them, and in doing so develop great heat and light, thus giving rise to the whole fascinating vista of vacuum discharges.

Nor is their wonderful activity confined to the fields enumerated, for the whole phenomena of magnetism are based upon the electron. Whenever an atom has a high valency, such as iron, cobalt, or nickel, it appears that the free electrons which constitute these valencies revolve around the rest of the atom. These revolutions produce whirls in the ether which are known as magnetic displacements or stresses, or "lines of force," and whenever a "conductor," *i. e.*, a body containing freely movable ions (say one for every five thousand neutral atoms) is moved through these whirls, the ions are set moving in opposite directions with a velocity of about one centimetre per second, and we have the whole phenomena of induced currents.

The enormous rapidity of the magnetic revolutions may be judged from their probable period, which is about one-trillionth of a second. In the electric arc we have not only a great exchange of opposite ions, but this ionizing action of ultra-violet light — and Elster and Geitel have shown how this ionization action of ultra-violet light may lead to the elucidation of all the problems of atmospheric electricity. The latest information, as recently supplied by us, goes to show that ionization is constantly going on wherever there is matter, and that some bodies have the faculty of projecting either negative electrons or positive ions with some force. These bodies, like radium, actinium and polonium, are then said to be radioactive. Hurmuzescu has gone farther, and proved that the electrons revolving in magnets often shoot off at a tangent and "electrify" a liquid in which they are placed.

All these manifold applications of the electron idea show that we have here one of the most fruitful conceptions of the human mind. We have at last discovered, and even isolated, what we may call the "electric substance." We can weigh it and measure it and produce it in any quantity. It may yet prove to be the "protyle" of the philosophers; the fundamental and primordial substance of the universe. Whether it is that or not we have now some definite and almost tangible nucleus around which to crystallize our thoughts. The "electric charge" is now no longer a mere phantasm of the mathematician. It is a solid reality; as solid, at least, as a deal table. It remains . . . to remodel our text-books in accordance with the new truths, and to build up our whole electrical science upon the properties of the substance whose conquest has been so long and arduous a task. — *London Electrician.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, ARLINGTON AND NEWBURY STS., BOSTON, MASS. MR. C. HOWARD WALKER, ARCHITECT, BOSTON, MASS.

SECTIONS AND PLANS OF THE SAME.

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, ARLINGTON AND NEWBURY STS., BOSTON, MASS. MESSRS. PARKER & THOMAS, ARCHITECTS, BOSTON, MASS.

[The following named illustration may be found by reference to our advertising pages.]

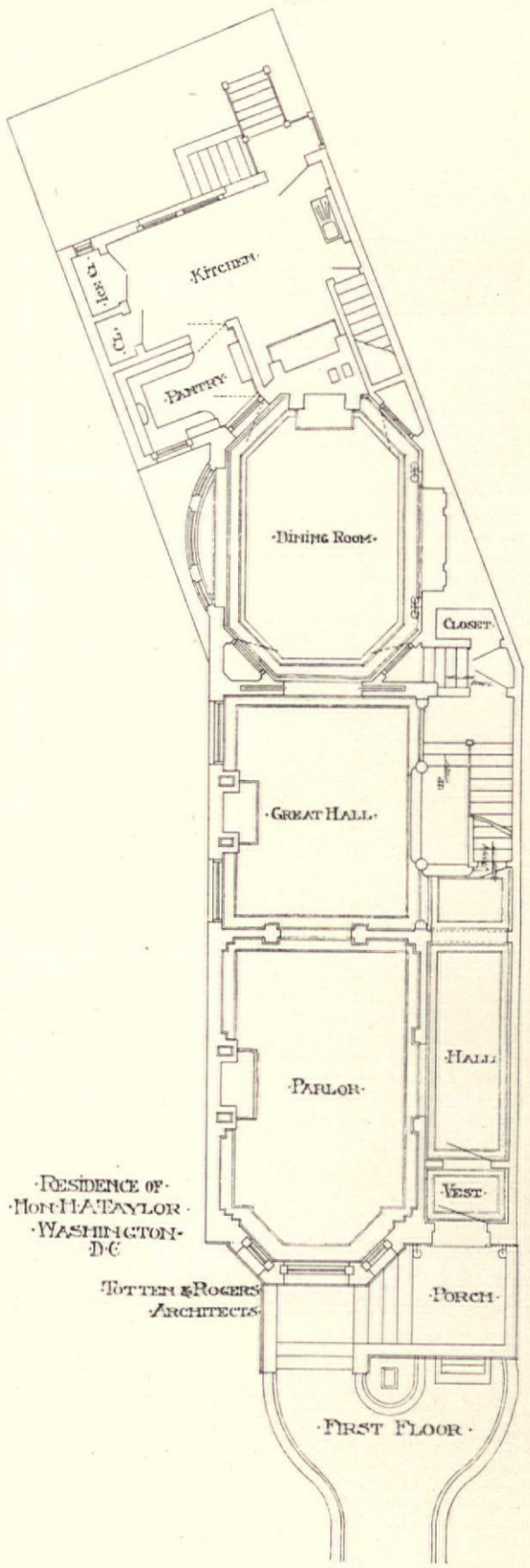
PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: — PERGOLA AND COLONNADE. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Additional illustrations in the International Edition.]

A HOUSE AT BAR HARBOR, ME. MR. A. W. LONGFELLOW, ARCHITECT, BOSTON, MASS.

HOUSE OF HON. H. A. TAYLOR, WASHINGTON, D. C. MESSRS. TOTTEN & ROGERS, ARCHITECTS, WASHINGTON, D. C.

THIS house was built for the Hon. H. A. Taylor, Assistant Secretary of the Treasury. It is located on the north side of Massachusetts Ave., west of 20th St., and was designed by Totten & Rogers, architects. It is somewhat in the style of the early Italian Renaissance. The façade is of Indiana limestone, with the upper



panels of red Vermont marble, the cornice of copper and the roof, tile.

The lot upon which the house stands is quite irregular, but this is overcome in the plan, so that one does not notice any irregularity in the interior. The first story consists of a reception-room, central hall, dining-room, butler's pantry and kitchen. The reception-room is treated with pilasters and a richly-decorated cornice, all white,

while the body of the walls is pink; the effect is very rich. This room is unique, inasmuch as the side-walls do not extend to the ceiling, thus giving vistas into the adjacent rooms. The staircase ascends from the central hall, which is partly screened by three arches; the treatment of this room is mahogany.

The dining-room is an irregular octagon in shape. This room, too, is largely of wood — oak, of rich dark antique finish. As the Secretary has a rare collection of Indian vases, heavy shelves, supported by pilasters, are placed over each door, forming a sort of plate-rail. The elaborately carved fireplace at the end of the room forms the terminating vista of this floor. The side-walls are lined with burlap, hand-stencilled.

MANTELS, ETC., IN THE SAME HOUSE.

DOORS AND GATEWAYS, HALLE ON THE SAALE, SAXONY: TWO PLATES.

These illustrations are copied from *Architektonische Rundschau.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

LIBRARY ARCHITECTURE.

MADISON, WIS.

To the Editors of the American Architect:—

Dear Sirs, — A meeting of librarians, trustees and all others of the West and Middle West interested in library work will be held at the State Historical Library Building, at Madison, Wis., on Thursday, Friday and Saturday, August 28, 29 and 30, next.

Saturday afternoon, August 30, will be exclusively devoted to the subject of "Library Architecture." Architects are cordially invited to make exhibits and to attend this meeting, that a full discussion may be had between librarians and architects on the principles which should govern library architecture. This is the first time in the history of the library movement of the West that a full session at a meeting has been devoted to this subject, and it is earnestly hoped that many architects will avail themselves of the opportunity to meet librarians for interchange of opinion on the date mentioned.

Further particulars may be obtained by addressing

[Miss] L. E. Stearns.

A CORRECTION DENIED.

BOSTON, MASS., July 24, 1902.

To the Editors of the American Architect:—

Dear Sirs, — In the July number of *The Ladies' Home Journal* — as the third prize for $5,000 country houses — was published a photograph of a house designed and superintended by me, stating that the house was from plans by the owner.

I courteously called the attention of the *Journal* to the facts in the case, and after some correspondence, offered to send them a sworn statement from the builder and from persons in my office who saw the sketches and plans prepared there, to all of which they return answer that they decline to make any correction.

If you would care to express an opinion on what to me seems such a piece of high-handed injustice, it would give me great satisfaction.

Very truly yours, G. Walter Capen.

[There is nothing more curious in life than the discovering just what other people consider decent behavior. — Eds. American Architect.]

NOTES AND CLIPPINGS

German Artificial Clay. — Artificial clay, according to recent German reports, is receiving increased attention abroad. This ceramic novelty, which is used for the manufacture of artificial stone, tiles, gutters, etc., is composed of sand, chalk, cement, liquid-glue, and petroleum. The substances are mixed in certain quantities, and a clay-like mass results, which can be formed at pleasure, and acquires an excellent degree of hardness by being subjected to heat. The artificial clay can be employed in a variety of structures; tiles of different form and sizes are made of it. They have a perfectly even surface and sharp edges, are fireproof, and resist the influence of the weather; they furthermore absorb no moisture. The clay is also used for the manufacture of artificial stone in all colors. Tests with this clay have been made at the Technical Experimental Station at Charlottenburg, and the results have been pronounced very favorable. As the substances are easily mixed without the aid of machinery, the United States Consul at Frankfort says that the smallest builders can use the process, and so obtain structural decorations at a low price. — *Journal of the Society of Arts.*

Roman Villas. — There was no limit in the size and no regularity in the construction of a Roman villa. The opulent patrician indulged in many, spread over the fairest districts of Italy, in situations either adapted to the changes of the season and to the taste of the owner, or dictated by his caprice and the fashion of the times. The arcaded substruction of numerous ancient villas still remains, while the buildings above are in ruins, either by the depredations of those who in after ages demolished to erect other buildings, or by the silent waste of time on such as were erected of the soft tufa. On many of the Roman villas convents and monasteries were erected, as materials were at hand, and the arcades of the substructions formed conveniently storehouses and cellars. How long the Roman villas remained habitable after the many invasions of Italy is not easy to ascertain. One of the celebrated villas of Lucullus, formerly belonging to Marius, and afterwards an imperial residence of Tiberius, situated on the promontory of Misenum (Capo Miseno), existed in the year 480. To this retreat was sent, by the clemency of Odoacer, King of the Heruli Goths, the last feeble representative of the Roman Emperors of the West, called in derision Augustulus. The villa had gradually been changed into a strong castle to protect it against the sea attacks of the Vandals. These invasions by sea of the Vandals, and subsequently of the Normans and Saracens, ruined probably the crowd of Roman villas on the Neapolitan shores. The villas on the fertile plains of Italy would suffer by the invasions by land; but many villa castles, or fortified residences, remained after the tenth century in the hilly districts of the Vicentine and Veronese territories, as their rural nobility descended into the cities of Padua, Verona, Vicenza and Trevisa, and took part with the Guelph faction. In the thirteenth century 150 castles were computed to be in the Milanese. It was probably to a Roman villa that Avitus, lieutenant of the Emperor Maximus, and afterwards himself a short-lived emperor, retired in the year 460. It was situated near Clermont, in Auvergne, on the margin of a lake, into which rushed a mountain torrent of cascades. The villa contained baths, summer and winter apartments and porticos. Sidonius, the son-in-law of Avitus, has, in imitation of Pliny, given a prolix but obscure description of it. — *The Architect.*

Why the Pyramids were built. — The interest of the Delhi and Benares observatories lies for us in the fact that they recall a time far in the past when astronomers sought for exactness by the erection of huge structures of stone. Of these the Great Pyramid is by far the greatest and most perfect example. Britain has its own monument — Stonehenge — which has been claimed as, if not indeed an astronomical observatory, at least an astronomical temple, and many attempts have been made to determine the date at which it was erected. The difficulty, not to say the impossibility, of solving this problem in the present state of the monument may be inferred from the fact that the dates which different careful observers have deduced for its erection extend over a period of more than two thousand years. The real work of astronomy was never done in edifices like these. Nor, indeed, does it require much knowledge of human nature, essentially the same five thousand years ago as to-day, to see that the true secret of the Pyramid, the amply sufficient cause for its building, was the vanity of the ruling Pharaoh. Alike at Delhi, at Ghizeh, and on Salisbury Plain, as by the Euphrates, to "make a name" was the exciting motive. Astronomers may have been employed to superintend the work, astronomy, or the cult of the celestial bodies, may have been the excuse, but the real object was advertisement. — *E. Walter Maunder, in Knowledge.*

Cooling a Roof. — Some readers of the *Metal Worker* probably will be interested in the method I adopted for satisfying a customer who desired to have the part of a building immediately under the tin roof made cooler, owing to the illness of the occupant of one of the rooms. Between the ceiling of the room and the roof was a small air-space, which is quite generally provided in the construction of buildings, but it was insufficient to prevent the heat of the roof making itself very perceptible in the chamber beneath. As the work had to be done quickly and without any damage to the roof already in place, a makeshift was resorted to. I purchased some thick, soft, open texture wrapping-paper, covering the roof with six thicknesses of this material. Above this I laid 1-inch boards about a foot or so apart, and on the top of these two more thicknesses of the soft paper. On top of this again I laid 1-inch boards close together and weighted them so as to prevent any danger of their being blown off. I then arranged for connecting a hose with the house water-supply at the highest point in the building so that the entire roof could be wet down to further counteract the heat of the sun. The effect not only reduced the temperature of the room several degrees, but also produced a benefit that satisfied my customer and had a substantial influence upon the convalescence of the patient. — *D. S. in the Metal Worker.*

To prevent the Freezing of Gas-pipes. — A simple but effective device for preventing the freezing of gas-pipes is described in the *Illustrirte Zeitung für Blechindustrie,* consisting merely in the insertion of a wider piece of pipe just where the conduit issues from the ground or wall. For a conduit of a diameter from ⅜ inch to ½ inch, a length of from 20 centimetres to 30 centimetres of a pipe 1 inch in diameter suffices. The deposition of the water-particles contained in the gas, which on leaving the works have a temperature of about 10° C., naturally takes place just where the gas is subjected to the most abrupt change of temperature — *i. e.,* on its issue from the ground. If the external temperature is sufficiently low, the deposited water immediately congeals, and clogs the conduit. As soon as the gas has acquired the temperature of the conduit, the deposition of water and congealing cease; and this is said to be the case a short distance beyond the first cooling-point. Therefore there should be no congealing beyond the inserted wider piece, and this piece is wide enough to accommodate a thick ice-crust and to still leave a free passage for the gas. — *Building News.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, AUGUST 9, 1902 No. 1389

CONTENTS.

SUMMARY: —
The late Accident in Venice. — A Summer Class for Stone-carvers. — The Interior Decoration of the new Pennsylvania State-House. — The Incorporation of Trade-Unions. — Decline of the Iron Trade in England. — The Forfeiture Clause in French Building Contracts. — The proposed new Front for Milan Cathedral. — Public Improvements in Paris. — French Strivings after Originality. — The Decaying of the Sphinx. — German Archæological Investigation in Asia Minor. 41
LIBRARIES IN THE UNITED STATES. — IV. 43
HEREFORD CATHEDRAL. 44
THE FALL OF THE TOWER OF ST. MARK. 46
ILLUSTRATIONS: —
A Competitive Design for the Boston Athenæum, Boston, Mass. — Houses on the Bay State Road, Boston, Mass. — Hereford Cathedral, from the Southeast. — United States Post-office and Court-house, Fergus Falls, Minn.
Doorway: Hôtel de Ville, Tours, France; — Entrance: Chamber of Commerce, Tours, France.
Additional: Entrance to House of G. B. Harrah, Esq., 64th St. and Madison Ave., New York, N. Y. — The Arlington Hotel, Marlin, Tex. — Plans, Section and Elevation of a Competitive Design for the Boston Athenæum, Boston, Mass. — Decoration in the Salle du Trone, Palais du Luxembourg, Paris, France. 46
COMMUNICATION: —
An Eye-witness on the Fall of St. Mark's Tower. 47
NOTES AND CLIPPINGS. 48

PROFESSOR BONI, who has been called from Rome to advise in regard to the Venetian campanile, is endeavoring to find some drawings of the structure which may aid in its restoration. There are multitudes of photographs and engravings of the exterior available, but nothing like a geometrical section has been found, although the archives and libraries of Venice have been searched. Meanwhile, the most valuable portions of the building have been found nearly uninjured by their fall. The whole front cornice of the Sansovino Loggetta, with its bas-reliefs and columns, and three of the angels which surmounted it, have been recovered intact, and two of the bronze statues have been found, one with the head broken off, and the other with the hands slightly damaged. The bronze gates are also uninjured, so that the cost of restoring the most expensive portion of the structure will not be large. The investigation of the brick walls of the tower shows that, as might have been inferred from their collapse, they were badly built, in some cases being merely shells, filled in with rubbish. Among the ruins have been found large numbers of Roman bricks, stamped in such a way as to identify them as having been brought from Altinum, an ancient Roman city on the mainland, near Torcello. Altinum was deserted and in ruins long before the time of the prosperity of Venice, and it is probable that the remains served as a quarry for the Venetians at the time of the construction of the campanile.

PROFESSOR JOHN W. BURGESS, of the Law Department of Columbia University, has earned the gratitude of his fellow-citizens by establishing a summer class in sculpture in the town of Montpelier, Vermont, for the benefit of the carvers and stone-cutters in the neighboring granite-quarries. The class is under the care of Mr. Charles A. Lopez, of New York, who gives instruction from seven to ten every evening, and on Sunday afternoons, so that the men can attend without losing any of their working hours. The granite-cutters are said to take much interest in the undertaking, and to show already marked benefit from the instruction they receive. Hitherto, as the American stone-cutters have been, almost without exception, destitute even of the most rudimentary notion of artistic quality in their work, the French and Italians have practically monopolized the best-paid positions, and Professor Burgess has done a good deed, the influence of which may be incalculable, in setting the example of furnishing to our own citizens some of the advantages which every stone-cutter's apprentice in France or Italy enjoys.

THE newspapers announce that two distinguished artists, both natives of Pennsylvania, Mr. Edwin A. Abbey, the painter, and Mr. George G. Barnard, the sculptor, have been commissioned to execute the decorations of the new Pennsylvania State Capitol at Harrisburg. Four hundred and fifty thousand dollars have been appropriated, it is said, to pay them for their work. We are happy to congratulate, not only these eminent artists, but the people of Pennsylvania, on the prospect that so great a work may be carried out under such auspices. Architects, remembering the competition in which the profession was so grievously ill-treated, will probably wonder how a building, the total cost of which, as they were told, was absolutely limited by law to five hundred and fifty thousand dollars, should have developed so quickly into a structure which will, it is said, cost at least five millions, and is to be decorated on so lavish a scale; but this mystery, which is not without precedent in architectural history, need not prevent the new Capitol from becoming an ornament to the State and to the country.

MR. J. C. PUMPELLY, whose interest in public matters has before been shown, writes to the New York *Tribune*, urging that trades-unions should be required to be incorporated. As he well says, most of the troubles into which union men fall, and into which they bring other people, are due to the plotting or persuasion of irresponsible men, who cannot be brought to account for the ruin which they bring upon those who trust them. By incorporation, the members of the unions would gain much. While other people would be protected by the fact that the officers and property of the corporation could be held liable for corporate wrong-doing, the union members themselves would be protected in the same way against dishonesty of their own officials, and against the attacks of other unions, which now form a considerable part of the trials of workingmen; and there is no question that with corporate responsibility would come a reasonableness and conservatism in the management of unions which they sorely need. In England, which has suffered greatly, and still suffers, from the tyrannical folly of unions, something has been done toward compelling them to assume the responsibilities of corporate existence, and there can be no doubt that this application of the good old rule, that where there is power there must be responsibility, would be as wholesome in connection with associations of workingmen as it has proved to be elsewhere.

MR. PARKES, in his presidential address before the General Assembly of the British Iron Trade Association, made some interesting comments on the decline of the iron trade in England. While American competition is now little felt in Great Britain, the American mills being fully occupied in supplying the home demand, German iron is rapidly finding its way, not only into England, but, apparently, into markets hitherto supplied from English mills. Within two years, from 1899 to 1901, the exportation of English wrought-iron diminished about twenty-two per cent, while the exportation of cast-iron fell off, during 1901 alone, about six hundred thousand tons. At the same time, the importations of wrought-iron and steel, mostly from Germany, increased from six hundred and forty-five thousand tons, in 1899, to eight hundred and sixty-eight thousand in 1901, or nearly thirty-five per cent. It is probable that a good deal of this decline of British industry before German competition is due to the short-sighted tyranny of the labor unions, seconded by the extraordinary fatuity of that group of economists which professes to find in English trade conditions of the present day the solution of social problems; but the importance of the situation, as Mr. Parkes justly observes, lies not so much in the loss of British trade to the Germans as in the prospect of far more disastrous loss when American competition again begins to be felt in the English market. It is only a very few years since the annual production of American iron, much to the pride of American public men, reached that of Great Britain; it is now about two and one-half times that of Great Britain, and is rapidly increasing. For the present, the enormous domestic consumption absorbs the whole American production, but there are already signs that consumption in this country is beginning to fall off, and any serious decline in the domestic demand would throw upon the market a large surplus of iron, which must be sold somewhere, in order to keep up interest and dividend payments. The American iron-mills, enabled by the tariff to sell at an

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

enormous profit to their customers at home, and protected by combination from domestic competition, could well afford to dispose of their surplus iron in foreign markets at cost, or less, for the sake of keeping their men and machinery employed. This phenomenon has been already observed, before the flood of domestic orders absorbed all the iron that the American mills could make; and it is reasonable to suppose that it will recur, on a much larger scale, when the domestic consumption again falls below production. Meanwhile, the resources of the Americans for producing and transporting iron at the lowest cost have been improved, and their competition in foreign markets, when it is again felt, is likely to be more serious than ever.

LA CONSTRUCTION MODERNE publishes an interesting note on the manner in which the forfeiture clause in building-contracts is treated by the French courts. A correspondent writes that one of his clients contracted for the construction of a certain building, to be completed in four months, the builder agreeing, by the contract, to forfeit forty dollars a day for every day's delay beyond the date specified. The building was not completed until fourteen days after the stipulated time, and the owner claimed the full amount of the forfeiture. The contractor refused to admit the claim, partly on the ground that the penalty was excessive, and partly because, as he said, the clause providing a forfeiture for delay was invalid unless a corresponding clause provided a premium for completion of the work before the time agreed. It is curious to find that this latter superstition, which, we need not say, has no foundation whatever, prevails on the other side of the ocean, as well as on this. The architect, who seems to have been a sensible and clear-headed man, told the contractor that the clause, as it stood, was valid, and that he was legally bound to pay the stipulated penalty; but, for his own satisfaction, he referred the question to M. Ravon, the legal expert of *La Construction Moderne*.

M. RAVON, in reply, fully confirms the opinion of the architect. In this country, as our readers know, the courts uniformly hold that the owner, under such a contract, can recover from the contractor only compensation for the actual damage that he has suffered from the delay, no matter what the agreed forfeiture may be; but French jurisprudence takes a different view. The Paris Court of Cassation, in 1881, held that "When a penal clause has been formally stipulated in a contract for work to be executed, obliging the contractor to pay a determinate sum as damages for each day of delay after the stipulated time of completion, this clause must be maintained, as being the free expression of the will of the parties, reserving to the Court the right of determining the number of days of delay chargeable to the contractor"; and this decision has been followed ever since. In the present case, the contract stipulated that notice of the claim for delay should be given to the contractor by registered letter; and M. Ravon observes that unless notice was actually given in this way the penalty could not be enforced, for the reason that, in all such cases, all the conditions agreed upon must be strictly complied with.

AS we have already mentioned, the project for the construction of a new front for Milan Cathedral, which formed the subject of a great international competition some years ago, has been abandoned. The death, soon after the competition, of Signor Brentano, the distinguished young architect to whom the commission was awarded, caused a delay in carrying out the scheme, and, in the meantime, the conservative party among the citizens gained strength so rapidly as to prevent it from being taken up again, and the fund bequeathed by Signor Togni, in 1884, to be used in the rebuilding, has now, apparently with the consent of all parties, been devoted to charity, and the Renaissance front will be left undisturbed. As it happens, however, an earlier bequest provided funds for adorning the front with a pair of bronze doors. The sculptor to whom was awarded the commission for this work, Signor Pogliaghi, supposing that a Gothic front was to be built, under the Togni bequest, made a Gothic design of great merit; but the execution of the design was suspended during the discussion over the alterations. Now, although it has been decided to retain the Renaissance front of the Napoleonic era, the authorities see no reason for changing the style of the doors, and they are to be carried out as designed for the Gothic front in which it was supposed they would be set.

THE city of Paris has taken advantage of its present prosperity to devote immense sums of money to public works. The underground railway, which is being rapidly extended, will cost nearly seventy million dollars before the lines already laid out are completed; more than ten millions will be immediately expended in street improvements; and it is said that, under the urgent advice of the medical officers of the city, nearly all the great hospitals will soon be rebuilt, at an estimated cost of about sixteen million dollars. The population of Paris is now twenty-eight hundred thousand, or nearly the same as that of Greater New York, and it is burdened with a large debt; so that the new undertakings indicate confidence in the future on the part of the Municipal Council, which, whatever its political eccentricities, has shown great prudence, as well as liberality, in its administration of the municipal finances.

IT is possible that the recent relaxation of the Parisian building-laws has done something to encourage the rapid development of the new style of French architecture, which forms, to the professional tourist, the most striking feature of recent Parisian construction. We have often illustrated the principal specimens of the new art, of which the Palace Hotel, in the Champs-Elysées, was one of the first, and is still the most conspicuous example. This has been followed by many other works, which, although, for the most part, less refined, and, therefore, less successful, agree in showing a determined revolt from the forms and fashions hitherto accepted which may contain the germs of a new and great art. We are very far from thinking that there is anything artistic in eccentricity; and the trouble that some of the "advanced" Parisian architects take to defy every kind of architectural tradition indicates a temperament unsuited to the highest artistic achievement; but the worst of the French eccentricity has nothing of the dull brutality which characterizes the works of the American or English contractor who has undertaken to "draw out" something "different" from the ordinary type, and the best, perhaps, contains the germ of a new artistic development. It must be confessed that the embryo appears, as yet, to be a very small one, but a man of genius, starting from the new principle of designing architectural forms purely as agreeable combinations of line and light and shade, without reference to precedent, may accomplish wonders.

A CURIOUS story comes from Egypt, to the effect that the Sphinx is "rapidly decaying," owing to the increased moisture of the Egyptian atmosphere consequent upon the more extended and regular irrigation of the country. It is well known that rain, which was formerly very rare in Egypt, now occurs quite frequently, and it seems not impossible that this may have had its effect upon the coarse red granite of which the Sphinx is made. Many years ago, two sculptured blocks of red granite from Egypt stood in a garden in Waltham, some ten miles from Boston. If these blocks are still there, it might be instructive to study the effect upon them of the New England climate. It is well known that the New York obelisk has suffered greatly from American rains and frosts, but it may be that the sulphurous vapors of a great coal-burning city have had their part in its disintegration, and the Waltham blocks, which have been in this country much longer than the Central Park obelisk, and have been exposed to a comparatively pure atmosphere, should afford valuable indications of the action of the weather on the material of which they are composed.

THE Germans have, with characteristic love of learning, improved their commanding mercantile position in Asia Minor to undertake a considerable number of archæological investigations, some of which have already been fruitful. One of the earliest of these explorations was devoted to the ruins of the great temple of Baalbek, which, after two years labor, have now been made intelligible, although another year will be required to complete the work upon them. Incidentally, some smaller ruins in the neighborhood have been studied, and, this summer, a preliminary survey has been made of the remains of Palmyra, Gerash and other cities east of the Jordan, with a view to their complete exploration later. Other parties have begun excavation at Miletus and at Babylon, as well as at a mound in Mesopotamia of which almost nothing is known. In Palestine, the English Palestine Exploration Fund has begun the investigation of what is supposed to have been the Biblical Gezer, and an Austrian and a German party are also at work in the neighborhood.

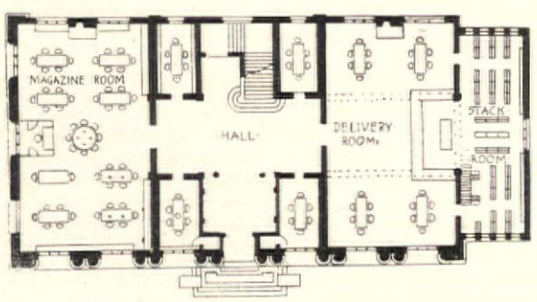
LIBRARIES IN THE UNITED STATES.[1]—IV.

TOWN LIBRARIES. — DIVISION II.

AT least two distinct types occur in the libraries selected to illustrate plans adopted in this class. The Atlanta and Davenport represent one and the Pawtucket the other. The latter has only a basement and first floor; the others have an additional floor. At Atlanta the plan is more compact, and, therefore, more easily worked as a library than the rather monumental plan at Pawtucket. The open-shelf rooms adjoining the stack-room and either side of the delivery-space are excellent features in the Atlanta Library. The Utica Library has not been erected yet. It seems to come midway between the above types. All the important rooms are placed on the first floor. Among the points worthy of note are the reference-spaces (10 feet wide) on each floor of the stack-room; the important position of the children's room, which balances the general reading-room; and the provision for special study-rooms. Libraries of this size — the cost ranging from £20,000 to £50,000 — are becoming very numerous, and there is no doubt many new developments in their planning will be always taking place.

CARNEGIE LIBRARY, ATLANTA, GA.

The Carnegie Library, Atlanta, Ga., was completed and opened last year. It consists of three floors, and is built on an isolated site. The main-building has a frontage of 116 feet and a depth of 64 feet;



First Floor: Carnegie Library, Atlanta, Ga. Messrs. Ackerman & Ross, Architects.

projecting from the side to the right is the building for the book-stack, 18 feet wide and 56 feet deep, set back 5 feet from line of frontage.

The basement is reached either from a small back entrance or from the staircase leading from the main-entrance hall on the first floor. It is 10 feet 6 inches in height. The children's room extends across the whole of the west side. It is 33′ 6″ x 58′, and well lighted on three sides. It is divided into two by a gangway 8 feet wide, leading to the attendant's desk; either side of the gangway are railings 2 feet 6 inches high, having gates in them next the attendant's desk, so each child entering or leaving is well under control. Each of these rooms has 6 tables, seating 4 readers each — tables vary in shape and height. The sizes of these tables are as follows: Tables 3 feet 6 inches diameter, 1 foot 10 inches high, chairs 1 foot 2 inches high. Tables 3′ x 5′, 2 feet 4 inches high, chairs 1 foot 4½ inches high. Tables 3 feet 6 inches in diameter, 2 feet 6 inches high, chairs 1 foot 5½ inches high.

Seats are fitted in each of the windows; they are 7 feet wide and 1 foot 4 inches high. The catalogue-files are placed either side of attendant's desk. Specimen-cases with glazed-doors, bulletin-boards with portfolios under, and shelving 8 inches deep are placed to a height of 6 feet 6 inches between the windows, as well as on the east wall. In a similar position on the east side is the work-room. It is 33′ 6″ x 58′, lighted on two sides, north and south, and a central opening from it enters directly into the stack-room, the floor of which is up 6 steps. This latter room is 17′ x 52′. The stacks are well arranged and lighted, and will take on each floor approximately 17,220 books. Two lifts with a table between, and a staircase adjoining to upper floors, are grouped together, and near at hand a toilet-room for staff is provided. There are altogether 4 floors of stacks, each 7 feet 6 inches in height. The upper floor is top-lighted, and is at present used as the cataloguers' room. The stacks themselves are especially well arranged, having ample space between for reaching the books. The two floors above are stacked in a similar manner.

On the first-floor plan the hall is placed right in the centre of the building, and is reached directly from the entrance-vestibule. It is 42′ x 20′. The main staircase opens directly out of it on the north side. To the left is the magazine-room, and to the right the delivery-room. The 4 smaller rooms that open from the hall are placed either side of the staircase and vestibule; they average about 11′ x 17′ 6″, and are used as special study-rooms and for the medical library. Each of these rooms is provided with a table 3′ x 8′ and 2 feet 6 inches high, and shelving to walls 6 feet 6 inches high. The medical-library shelving has glazed doors and a magazine-rack beneath the window. The delivery-space is 22′ x 20′ wide, the latter width being the length of delivery-counter to the public. It has in it the cases for the card-catalogue and 2 tables 6′ x 2′ for its use. On each side of this delivery-space 2 rooms are set apart for open shelves. They are divided by railings 2 feet 6 inches high, fitted with gates, and are each 25′ x 18′ 6″. Both have 2 tables, each 3′ x 8′, and 10 feet of the return of the delivery-counter on each side face towards these rooms. The counter is 3 feet wide, 2 feet 10 inches high, fitted towards attendant's desk with drawers, cupboards and shelves. There is a working-space of 12′ x 18′, with table for the attendant, and behind it is the opening to the stack-room, being the full length of the working-space. The stack-room is also approached from each of the open-shelf rooms; it is arranged practically as the floor below — 2 lavatory-basins for public use take the place of the staff toilet.

The magazine-room is the same size, 33′ 6″ x 58′, as the children's room below it, and the windows are placed on the three sides in a similar manner. The attendant's enclosure with desk is placed directly opposite the entrance. It is about 9′ x 9′, with a panelled railing 2 feet 6 inches high enclosing it, and having a gate opening into either side of the room. There are 8 tables, 3′ x 8′, 2 feet 6 inches high, each having 6 chairs, 1 foot 5½ inches high; and in the centre of the room, opposite the attendant's desk, is a circular table 6 feet in diameter seating 8 readers. Seats are provided in the window-openings, and along the front wall a standing newspaper-desk 25 feet long. Shelving 8 inches deep and roller-shelving 2 feet deep by 6 feet high occupy the remaining wall-spaces. Here will be kept the bound volumes of the magazines and the current files of all the weekly and monthly periodicals.

On the second floor the reference-room is placed over the open-shelf room and delivery-space. It is 33′ 6″ x 58′, and has the attendant's desk exactly opposite the entrance, and opening out of what will be one day the top floor of the stack. The tables, etc., and the number of readers they accommodate, are as the magazine-room already described. The shelving is 10 inches deep instead of 8 inches, and there is a case 9 feet wide with 20-inch deep roller-shelving for atlases. It is 14 feet in height and is well top-lighted, in addition to the windows front and back. A temporary panelled partition 6 feet 6 inches high separates this room from the catalogue-room at the back of the attendant's desk.

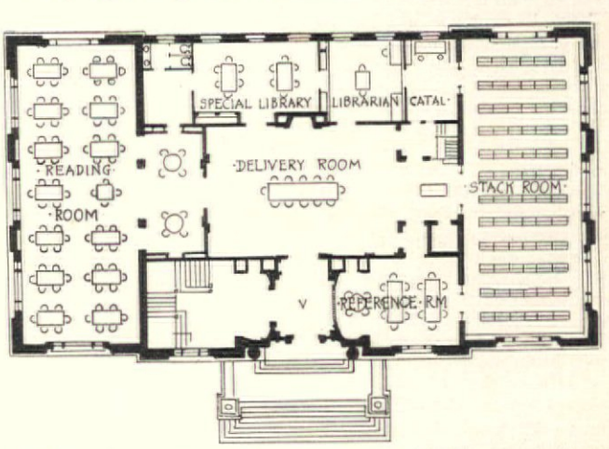
The rooms for the librarian are placed in the centre of the building, to the front a public office 21′ x 18′, and a private office 17′ 6″ x 10′ 6″. Opposite, on the other side of the upper hall, are placed the women's toilet and staff room. The latter is fitted with ten 14″ x 16″ x 6′ 6″ lockers, with 6-inch drawers at bottom and shelf at top. There is also a sink and a marble-topped table adjoining, with small gas-stoves.

The large room in another wing over the magazine-room, and of the same size, is fitted as a lecture-hall. This room will, according to the librarian's report, "eventually become the main reading-room of the library, with shelving-capacity for 5,000 volumes, specially selected."

The compactness of the plan is very marked, and it is of its type an excellent example. The total cost was £25,000, and it was designed by Messrs. Ackerman & Ross, of New York.

CARNEGIE LIBRARY, DAVENPORT, IA.

In many ways the Carnegie Library at Davenport, Ia., is similar to the library at Atlanta. It covers, though, somewhat less area, the frontage of the building being 120 feet long, with a depth of 64 feet. The site is an isolated one. In the basement — approached from entrances at both sides and by a staircase from the main vestibule above, are the 2 children's rooms, the reading-room, 25′ x 25′ with 6 tables seating 6 each (36), and the children's study, of the same size and fitted in the same way. Other rooms are provided for the reports and historic records, work-room 16′ x 18′, boiler-room 16′ x 26′, large storage-room (under delivery-room), plenum (under



First Floor. Carnegie Library, Davenport, Iowa. Mr. Calvin Kiessling, Architect.

vestibule), with inlets under steps to entrance, janitor's room, disinfecting-room, and the men's lavatory. The children's lavatory is placed off the study-room. On the first floor the delivery-hall, 26′ x 39′, is right in the centre of the building, and is reached directly from the entrance vestibule. It is top-lighted and 42 feet in height. In

[1] A paper by Sidney K. Greenslade [*A.*], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal* of the Society. Continued from No. 1388, page 38.

the centre is placed a large table to seat 14 readers. To the left is the general reading-room, 25′ x 60′, with small alcove at entrance between it and the delivery-room, 12′ x 30′. There are 16 tables, 13 seating 6 each and 3 seating 4 each. To the right is the delivery-counter (with work-space balancing the alcove on the other side of the hall), and the stack-room, 25′ x 60′. The latter is arranged for 2 floors of stacks, the 12 rows being each 18 feet long and the total shelving capacity 60,000 volumes. Entrance to the stack-room is accessible to the public, but controlled by electric-button snap-catch gates each side of the delivery-counter, at the command of the attendant. The reference-room, 18′ x 25′, with alcoves, is well arranged, having its entrance from the delivery-hall well controlled from the delivery-desk, and it also opens directly into the stack-room. The cataloguer's room, 11′ x 17′, and librarian's room, 17′ x 17′, with lift to librarian's private room above and work-room below, balance on the other side of the delivery-desk, and to the left of the librarian's room is the special library, 14′ x 24′. The ladies' cloak-room and toilet adjoin the general reading-room. On the second floor there are placed additional special library-rooms and private rooms for the literary circle, as well as an assembly-hall and exhibition-room. The architect is Mr. Calvin Kiessling, of Boston.

[To be continued.]

HEREFORD CATHEDRAL

IN 1877 there was a meeting of the Royal Archæological Institute at Hereford, when the late Sir Gilbert Scott, R. A., read a paper on the history of the Cathedral and acted as cicerone. He spoke as follows: —

"In giving the history of a great building, it was sometimes the case that the difficulty arose from too great an abundance of information — an *embarras de richesse* of historical facts, and such he dared say was the case when that prince among those who undertook such tasks, Professor Willis, compiled his unrivalled architectural history of Canterbury Cathedral, for in that case the most important parts of its history were so fully and accurately chronicled that Professor Willis must have found difficulty in condensing the materials, rather than in searching them out. At Hereford the case was very different, for here they found almost a nullity of historical information in regard to the building, except what was indirect and uncertain. He had to search, therefore, in every conceivable direction for such mere 'waifs and strays' of history as might suggest guesses or theories, or furnish excuses for them, which it was impossible to prove or test. In writing on Hereford Cathedral, in 1841, Professor Willis said: — 'It is much to be regretted that the period of no one part of this cathedral has been recorded with the exception of its front foundation.' How then could he (Sir Gilbert), who was no investigator of antiquarian documents, venture to give the history of a structure the builders of which, and those who were eye-witnesses of its erection, had neglected to record what they did and what they saw? But having accepted the task he begged their consideration of the difficulty he had met with, for the very paucity of information had increased the labor of seeking it, and poor as was the result, he should be ashamed to tell them the time and labor he had devoted to the task. Their sister society, the Archæological Association, had been before them on this ground, and a paper had appeared in the journal of that Association, written by Mr. Gordon Hills, which appeared to have so nearly exhausted the documentary information within reach, that he should, with the writer's permission, make free use of it, adding such information as he might have picked out elsewhere. . . .

"The see which now took the name of Hereford dated from very early times, and it was likely enough that there was a church of some importance there so early as Offa, the great King of Mercia, who treacherously murdered his son-in-law — or intended son-in-law — Ethelbert, King of East Anglia, somewhere thereabouts, in the year 793, for the purpose of adding his kingdom to his own. Hereford was then known by the name of Fernleigh, and the body of King Ethelbert was brought there for reinterment by a pious noble named Brithfrid. About 830 the church was rebuilt in stone by Milfrid, the ruler of Mercia, in honor of the now sainted Ethelbert, and about two centuries later it was rebuilt by Bishop Athelstan, in the time of Edward the Confessor. Athelstan's cathedral was, however, but short-lived, as it was burnt in 1056 by Griffin, the Welsh king, or Bruce, who slew Leofgan, the Bishop, and many of his clergy. Leofgan was succeeded by two natives of Lorraine. The first was Walter, nominated by the Confessor, and the second was Robert, appointed by the Conqueror. Robert of Lorraine, commonly called Lozinga, a corruption of Lotharingus, was consecrated in 1079, and he held the see sixteen years. He undertook the reconstruction of the cathedral, which had lain waste since the invasion by King Griffin, and he was said by William of Malmesbury to have built it of a circular form in imitation of the basilica of Aix-la-Chapelle. Now, they knew something of the church he chose for his model. It was a round or polygonal plan, imitated, as it was said, from the church of San Vitale at Ravenna, which had about the year 550 been erected by Justinian possibly in imitation of the Temple of Minerva Medica at Rome, and, more probably still, of the church of the Holy Sepulchre at Jerusalem. All those imitations were, however, but rough ones, and consisted mainly in the adoption of a round or polygonal plan. Charlemagne's church at Aix-la-Chapelle probably still existed, and was in idea very similar to those built afterwards by the Templars in rough imitation of the church of the Holy Sepulchre, which he probably had in his eye quite as much as that at Ravenna. But, however it was, the unfortunate fact remained that they had not in the Norman cathedral here at Hereford a trace or a suggestion of any of those buildings, and if Robert of Lorraine did really imitate Charles the Great's sepulchral basilica, his successors —and probably Bishop Reynelm — must have utterly obliterated his work.

"Reynelm held the see from 1107 to 1115. His reputed effigy bore what might be a model of a church, and his *obit* styled him as '*fundator Ecclesiæ Sancti Ethelberti*,' which was altered in a later hand, and he thought erroneously, to '*Hospice*.' Writers on the cathedral seemed disposed either to deprive him (Reynelm) of all claim as a builder of the cathedral, or to attribute to him the completion of the work begun by Lorraine. Neither of these suppositions seemed to him (Sir Gilbert) agreeable to common-sense. If Robert of Lorraine completed his design, or if Reynelm completed it, how was it that there was no vestige of anything agreeing with William of Malmesbury's description? Instead of that they had a church in a very straightforward Norman type — apsidal, it was true, but less pronouncedly so than usual, and bearing no resemblance whatever to that at Aix-la-Chapelle. Again, the architecture was not of the earlier Norman type, but that of a more advanced period. Nor did Reynelm complete the cathedral, for they found that this was not finished until 30 years after. He (Sir Gilbert) therefore inclined to the belief that Robert of Lorraine only began the church, and that, being a German, he was proud to do honor to the Imperial basilica of his fatherland; while Reynelm, who was probably a Norman, reverted to the manner of his own country. One could not but regret that Robert's church did not still exist, as it would have been quite unique among English cathedrals. Robert was a learned man in all the wisdom of his age. He was a poet, a mathematician, and learned in the stars and their influence on human affairs, and though intimate with Remigius, the builder of Lincoln Minster, with Walstan, who built that at Worcester, and probably with the builders of Gloucester, Tewkesbury, and other vast churches then rising, he perhaps scorned to follow in their wake, and gloried in imitating the basilica which overshadowed the great hero of his own race. Unhappily, what he had said was all they knew of the building of the Norman cathedral, excepting that it was not finished by Reynelm, but by his third successor, Robert Bethune or Betun, who held the see from 1131 to 1148, and who, having suffered, and his cathedral likewise, during the wars of King Stephen's days, lived to recover and repair the injuries incurred.

"The cathedral, then, throwing Lorraine out of the calculation, took forty years in building in its Norman form. The scheme of its design was that its nave had eight bays of not unusual Norman type, supported by massive round pillars to which double shafts were attached both to the north and south. The triforium was of moderate height and good design; the clerestory was somewhat lofty. The choir — or rather the precentory, for the choir proper was beneath the central tower — was of three bays, supported by piers, which were masses of wall rather than columns, and, judging from the great pilastering upon their inner faces, he agreed with Mr. Gordon Hills that it must have been vaulted, which was very unusual at that time in churches of so great a span. It terminated eastward in an apse, not formed, as was so frequent, by the swinging round of arcade, triforium, clerestory and aisles upon the altar as a centre, and uniting themselves together in semicircular continuity; but a separate and narrow structure, opening into the presbytery by an arch of moderate dimensions, over which the eastern wall returned in a square form. Each aisle also terminated in a smaller apse, and each of the three apses had its own separate roof. The transepts, of which one only remained, were of an ordinary type, without — at least, the remaining one was — the apsidal chapels, which are so usual. He had elsewhere shown that three not distant monastic churches of Gloucester, Tewkesbury and Pershore followed a scheme peculiar to themselves, and displayed great originality of invention. There was no trace of that scheme at Hereford. He was not sure, however, whether the nave here was not more beautiful than those of its more original neighbors. The less lofty columns, being surmounted by a well-proportioned triforium and lofty clerestory, formed a more elegant composition than the exaggerated lofty columns of Gloucester and Tewkesbury, which unduly stunted the upper stories of the nave, though it was possible that the two ranges of aisles in the choirs of those churches, running unbroken round the apse, and the continuous aisle, with its apsidal chapels, may have produced a more pleasing effect than the non-continuous arrangement at Hereford. It mattered little, however, which looked the best. They displayed two quite different systems, each being good and nobly carried out. They saw them now but in imagination, for all those churches had been so altered that the true effect was visible in none.

"He had said that the architecture of the cathedral was not early, but advanced, Norman. Its details in all the principal parts were decidedly rich in ornamental character, and very different from those of Remigius's work at Lincoln, at the consecration of which Lorraine would have been present had the stars been propitious; but no concurrence of stars could have rendered such details as those at Hereford possibly contemporaneous with those of the work of Remigius. He did not believe that a single stone of Robert of Lorraine's cathedral remained in its place. The great glory of the Norman cathedral at Hereford was its west front. It was probably the work of Robert de Bethune, and was consequently very late in

style. He mentioned that what little Norman vaulting remained was without diagonal ribs. Possibly Bethune's work was otherwise, as that feature had become frequent in his day. At some time during the Norman period the great timber hall of the Bishop's palace and the curious double chapel of St. Margaret were erected, and St. Catherine's, which adjoined. Bethune's successor was the famous Gilbert Foliot, but though he ruled fourteen years, nothing was heard of him respecting the cathedral.

"Sir Gilbert Scott then referred to the great transition in mediæval architecture during the time of the three successors of Bethune, and said that the next work done in the cathedral was the alteration of the east end by, probably, his fourth successor, William de Vere. De Vere reigned from 1186 to 1199, just the time of the two greatest Transitional works in the west of Britain, those of Glastonbury and St. David's, so that he was more likely to have been the promoter of the work referred to, as it displayed some marked resemblances to both the splendid structures just mentioned. The older abbey at Glastonbury had been burned in 1186, the very year of De Vere's accession at Hereford, and the next few years were devoted to the exquisite chapel of St. Mary, now known as that of St. Joseph of Arimathea, while the last decade of the twelfth century saw the rise of the unequalled abbey church itself. The chapel was more Romanesque in its character than the church, though both alike display a refinement of detail and workmanship, and an artistic sentiment which it was impossible to excel. They were the right glorious contemporaries of De Vere's work at Hereford. The work was a very fine Transitional character, with a large supply of that rich semi-Norman decoration which characterized the two great works alluded to; yet with other beauties derived from France, and with evidence, such as the great projection of the foliage of the capital, that it was not quite so early in its style. The great alteration Sir Gilbert Scott alluded to was the entire removal of the three apses and the substitution of an eastern aisle, supplying the deficiency in the first scheme of a continuous aisle or ambulatory round the apse, and the adding to that aisle eastward a range of chapels. The point most open to objection in De Vere's alterations was the blocking-up of the fine eastern arch of the presbytery, by which the interior was deprived of its culminating feature without the substitution of anything in its stead, and the beauty of the choir was most seriously damaged. The reopening of the arch was a work of our own age, and had done much to remedy the radical defect.

"They now arrived at the opening of the great thirteenth century, and here they had to start afresh with, if possible, still less direct information than they had hitherto found, though the church was rich in noble work of every part of the century, but every part was left to tell its own tale almost without even the suggestion of a date. He would pass over the mere guess that the first bishop in that century — Egidius de Bruce — built the central tower, the predecessor of that which now existed. It certainly was not the western tower, as some had supposed, for no such structure existed before the fourteenth century. First of all came the noble lady-chapel. This was wholly undated and unappropriated by any founder. He had come to the conclusion that the lady-chapel was somewhat early in its style, because the general details were not Transitional but developed Early English, and that a marked interval must have elapsed between the closing of De Vere's work and the beginning of the lady-chapel. It was true that at Lincoln and St. Albans they found developed Early English work at the very beginning of the thirteenth century, but where they had Transitional work of a very pronounced character up to the very end of the twelfth century they could hardly believe that the style at the same places suddenly changed without an interval. He would not, however, venture to assign it to any particular bishop. The bowing down of the vaulting upon the side-walls, which necessitated the arcading over the windows, had an Early appearance, but not so as to class it with Transitional work. He should call it a fine design of the earlier period of Early English, though the details of the crypt seemed too late even for that. The next work was the clerestory of the presbytery. It was a specimen of very advanced Early English. The windows had what Professor Willis termed 'plate tracery.' It was not improbable that the original clerestory and vaulting had become damaged by the unsettling and sinking of the tower, for he could hardly otherwise account for their having gone to the expense and inconvenience of reconstructing so important a part of the building. The style and details of the clerestory were particularly elegant.

"They now arrived at a yet more marked era in the architecture of the cathedral. The pointed style made its *début* in the Transitional work of De Vere, and they came to the second transition — that from Early English to Decorative — or from first to middle pointed. The windows in the lady-chapel were strictly lancet-shaped. Those of the north transept, to which they now came, had bar tracery — that was to say, tracery pierced in all its little spandrels and corners so as not to look like a flat surface, but like the bending about of the mullions. This invention was the Magna Charta of Gothic architecture, setting it free from all the trammels of its earlier years. The history of the see about the period when this work was introduced was remarkable, and threw more perplexity than light upon the origin of the great work. It was held from 1240 to 1268 by Peter de Aquabianca, a turbulent foreigner, who came over in the train of William, half-brother to Henry III. Aquabianca was a favorite of the King's, but hated by the clergy, and he was absent from England from 1259 to 1268 in the Holy Land. In 1264 the King, passing through Hereford, found there neither Bishop nor clergy, and the church in a ruinous state. He was enraged and reprimanded the Bishop, and threatened that if he did not quickly return and mend his manners, he would take the temporalities into his own hands. Aquabianca returned, but only to be taken prisoner and robbed of his wealth by the insurgent barons. He was imprisoned at Ordelay, and he died in 1268. If Aquabianca built the beautiful transept it was difficult to imagine how he came to have the will or the time to do so. Yet that he had a hand in it was certain. His exquisite tomb, which they might be sure nobody would have erected but himself, bears so close a resemblance to the architecture which overshadowed it as to leave no doubt that they were by the same hand. Sir Gilbert then proceeded to point out that the tower was not all built at the same time. He concluded that the work of the lower part of the transept was carried out by the Dean and Chapter in Aquabianca's time, and that it was completed by the two succeeding episcopates, somewhere about 1288. The great faults of the design were the straight-sided form of the arches and the thinness of the details of the triforium, but with those exceptions it was an exquisite architectural design. Sir Gilbert next referred to the shrine of St. Thomas de Cantilupe, and its translation from the lady-chapel to the chapel of St. John the Baptist in the aisle of the new north transept, which was partly, he dared say, built by himself, but not until then completed, remarking that they might rest satisfied that it was the *bonâ fide* shrine of St. Thomas of Hereford.

"After service in the cathedral, Sir Gilbert Scott gave an historical and architectural description of the fabric. After pointing out the various parts and their features which he had referred to in his paper, which served as an illustration of his remarks, he passed on to other parts of interest in the Cathedral. He pointed out as leading from the north porch into the nave a doorway of remarkable design, especially as to the crossing of its arch. It contains all the foliage of the Early English period, and the crisp natural foliage of the Early Decorated, which with other matters he thought showed its age to be about the same as the shrine of Cantilupe. It would follow, therefore, that the porch and the whole north aisle of the nave were built by Bishop Swinfield about 1288. The south aisle, though less ornate, he pointed out to be of the same age or thereabouts, and that consequently Swinfield must have built both the aisles and the nave. He described the style of the nave aisles as 'Early Swinfield,' and that of the presbytery aisles and the north-east transept as 'Late Swinfield.' In the north-east transept is the monument which he thought Swinfield in his later days erected to himself. These series of recessed monuments and effigies by which so many of his predecessors were commemorated in the walls of the presbytery aisles was probably owing to him. His death took place in 1315, and the question arose whether he had a hand in the rebuilding of the central tower, which Professor Willis seemed to have thought. He pointed out that two years after the accession of Adam de Orleton, in the year 1319, a remarkable circumstance took place in the history of the Cathedral. The Dean and Chapter, supported by the Bishop of Salisbury, petitioned the Pope to sanction the appropriation by the Church of the tithes of the parishes of Shrinfield and Swallowfield, in Berkshire, on the ground that they, the Dean and Chapter, wishing in past times to restore the fabric of the church of Hereford upon an ancient foundation, which the architects and builders of the time thought firm and solid, but which architects and builders in the time of the petitioners deemed to be weak and unsafe. Consequently all the money they had expended on sumptuous work to the honor of the House of God, twenty thousand marks in all, had been to no purpose; for they were now threatened with ruin so severely that there was no remedy to be had, according to the architects and builders, unless the old fabric of the church were totally removed, and on account of that and the expense caused in connection with the canonization of Thomas de Cantilupe, they were oppressed with various burdens of debt. The Pope replied in the following year — 1320 — granting them their request, and accompanied it with an assurance of his special devotion to the 'blessed Thomas,' whose canonization he had so tardily granted thirty-eight years after his decease. This led him to ask what the buildings were that were constructed on the old foundations, and what on the new? He could only conceive that they were the tower and north transept; and the question suggested itself, what had they done with the money? Sir Gilbert then entered upon a series of speculations as to when and by whom the second tower was built, citing different theories. He said it was of singularly beautiful design throughout, and drew attention to the extremely light work in the upper part, which was necessitated by the great weight of the former tower sinking and crushing all the other work beneath it. Passing on to the more interesting parts of the cathedral, he remarked that the transformation of the south-eastern chapel into a transept was probably late in the fourteenth century, when the style had much deteriorated. Not long after the beautiful chapter-house and its vestibule were erected with a great revival of artistic taste. It was believed to be 1375. The series of monuments about that time was interesting as showing the gradual passing from the Decorated to the Perpendicular style. Towards 1474 Bishop Stanbury erected his beautiful chapel adjoining the north presbytery aisle. The monuments and effigies of the various bishops were examined, and the beautiful addition made by Bishop Booth, in 1520, to the north porch was pointed out. The futile attempts at remedying the central tower were also examined. Towards the close of the

last century the western tower showed such symptoms of impending failure that several architects were consulted and the worst advice accepted, and on Easter Monday, 1768, it fell. James Wyatt was called in, and to him they owe the present western façade, which Sir Gilbert Scott described as about the dullest piece of work in any cathedral. He also pointed out the latest repairs by Mr. Cottingham since 1840. All the present arrangements of the Cathedral which had been made by Sir Gilbert Scott to suit modern requirements were also pointed out by him, and in one or two instances he expressed a doubt whether he would have made such arrangements had he to do the work over again. The cloisters, which contain numerous Norman fragments of stonework, were next examined, and the company, which had by this time dwindled down to only a few in number, lastly descended the crypt, and on reascending separated." — *The Architect.*

THE FALL OF THE TOWER OF ST. MARK.

MILAN, July 14, 1902.

ITALY has fallen under the weight of an immense disaster, which for a long time will agitate public opinion and the world of arts. The celebrated Campanile of San Marco, at Venice, the grand and elegant tower which rose near the Golden Basilica, is ruined, and this time it is no mere question of a false alarm, as formerly in the case of the impending ruin of the Ducal Palace, but it is a real one, whose effects cannot be lessened by any prudence in official language.

For some little time back, people remarked to one another that the Campanile of San Marco did not seem to have that absolute stability which every structure, ancient or modern, ought to have, if it is to keep at arm's length a disaster as sensational and irremediable as that which the Campanile of San Marco has just offered us. But no one suspected that this jewel of the artistic crown of Venice was about to fall in ruins all in a moment just as has happened. It is not long ago that it was again perceived that the structure of the campanile was defective, and its state of equilibrium compromised, a fact which was brought to attention by numberless cracks. In particular, the piers of the "contrecanne" [*sic*] were damaged, one of them being so seriously impaired that it had to be strongly banded with iron. So, each year as it passed required new safeguarding aids, that the preservation of the campanile might be guaranteed and the public reassured.

Lately, a commission of civil engineers, in conjunction with the attachés of the Bureau for the Preservation of the Monuments of Venice, having remarked once more movements in the tower far from insignificant, had settled on a plan for urgent repairs which were about to be begun. The attention of engineers was always turned upon the campanile, and this morning, July 14th, Signor Rupolo, the architect of the Bureau of Monuments, the man who was entrusted with the delicate work of the restorations in the Ducal Palace, having remarked very alarming signs, arranged that the Piazza of St. Mark should be closed to business and the public, thus giving notice of the threatening fall of the campanile, a disaster which nothing could now prevent.

In fact, this morning, at ten o'clock, the campanile fell, with all the upper portion of the tower, upon the side of the Piazzetta, producing a terrible clamor and an immense sensation.

A feeling of desolation at once spread amongst the people of Venice, so solicitous about the artistic grandeur of their unique city. The people were unwilling to believe that the celebrated tower, so long cherished by it, had no longer an existence; but alas, the campanile had doubled up on itself, and had become a mere mass of stones, a complete ruin.

At the present moment of confusion and obsession, one cannot definitely fix the responsibility, if there be any, and the Government is going to name a commission for a rigorous inquest, whose findings are to-day uncertain, although it appears that grave responsibilities do not exist so far as the attachés of the Bureau for the Conservation of Monuments are concerned. However this may be, in the shadow of this huge disaster, concerning the details of which the press will soon be overflowing, we can only take consolation in the fact that no victim of the disaster has been discovered, and this is indeed miraculous. One has only to consider the habits of the Venetians and foreigners alike, who fill the Piazza of St. Mark and the numerous shops of the Procuratie vecchie e nuove, at all hours of the day, and this consideration taken in conjunction with the morning hour, about ten o'clock, is enough to fill us with horror at the thought of what might have happened, if, as has been said, Signor Rupolo had not foreseen the possible disaster.

The Municipal Government was hastily convened, and the Mayor, after having officially denounced the disaster which had just fallen upon Venice and Italy, proposed, amidst the most sincere and justifiable applause, that the Campanile of San Marco should be rebuilt. In this connection, the municipality, for the purpose of a competition for the reconstruction, placed at the disposal of the Governmental authorities, the sum of a half million of lire ($1,000). A public subscription has been opened for the same purpose and it is certain that it will produce at the earliest moment a sum corresponding to the gravity of the disaster.

Aside from the ruin of the campanile we must, also, mourn the loss of the Loggia of San Marco, or the Loggetta of Sansovino, as it is commonly called, which was connected with the campanile on the face towards the Ducal Palace. Now it lies completely buried under the ruins of the tower — an immense heap of brick and stones, and is likely to be found, when uncovered, in a desperate condition. There is, however, a general feeling that it will be found possible to rebuild it if the fragments are sorted out with proper care, and we will hope that this may actually be done. It would be extremely happy, too, if in rebuilding the campanile a good proportion of the old material should be used, for the mere rebuildings of ancient edifices with new materials are never worthy of praise; they are mere lies, and such would be the fact with the campanile if a mere copy in new materials should be erected.

Significant damage has also fallen upon Sansovino's library, the Library of San Marco, which, at the time of its original construction, suffered from an accident which ruined one of the vaults, and caused the imprisonment of the author, who obtained his liberty through the intercession of the highest influences in the Republic.

Fortunately, the Basilica of San Marco and the Ducal Palace suffered no injury; but if the campanile had fallen forward, since it is erected *vis-à-vis* to the Porta della Carta, between the Ducal Palace and the Golden Basilica, the consequences might have been graver yet; a fact which gives us, in the midst of the gloom which has fallen on us, a certain feeling of serenity, a serenity which, in the midst of evil, allows us to perceive that things might have been worse. In short, everybody, the Venetian municipality, the Italian Government, highly moved by the disaster which I hasten to recount to you, have to-day determined to reconstruct the characteristic tower, without which the celebrated Piazza of San Marco would be unrecognizable, and this fact is something. Moreover, Italy everywhere feels the high responsibility of being, *par excellence*, an artistic country, and means to watch jealously over the preservation of its artistic patrimony, which is really the artistic patrimony of the intelligent throughout the world.

The disaster of the Campanile of San Marco has caused to be written, and will cause to be written, a quantity of misinformation upon its history, so I will give a brief *résumé* of the facts, not gathering them from newspapers and guide-books, where the truth is often as wanting as good sense in the head of a madman: —

The campanile was fully isolated, only having connected with it upon one side, that which faced the Basilica of San Marco, the loggia of Sansovino. Built of brick and Istrian stone, it was conceived with simplicity, and its *ensemble* had a *cachet* that was very characteristic. It appeared to belong to the Renaissance, just as did Sansovino's loggia and library, but in reality its origin mounted far beyond the fifteenth and sixteenth centuries; but properly speaking, the origin of the tower is obscure and uncertain.

It was founded before 948; people do not know in just what year; the works were continued up to 985 according to certain chronicles, and according to others until 1068 or 1147, while some say 1310. At all events, in 1489, the campanile was badly damaged by a fire. Giorgio Spavento was interested in the restoration which was carried out; again, in 1511, an earthquake was still more disastrous for the tower than was the conflagration of 1489. This time, the tower received the belfry-story — perhaps designed by Bartolomeo Bon, of Bergamo — a story of exquisite sobriety, which constituted the more ornamental portion of the tower. It should be noted that the author of this belfry-story has not been clearly identified, and it is only by induction that the best-informed critics of the day venture to name Bartolomeo Bon, who may be confirmed as author, or denied, if ever any documents may be found to throw light on this obscure point in the history of our monument. It must be added that the conflagration of 1489 burned the summit of the tower, which was gilded, and also attacked the Church of the Frari.

It is also to be remarked that the common belief that the tower had foundations as deep as the tower was high, and that these foundations were star-shaped, and that they even passed under the Basilica, with a platform built of tree-trunks, arranged in pyramidal fashion, from the perimeter to centre, an opinion frequently reiterated, was done justice to by the studies carried out in 1886, which demonstrated that the foundations of the Campanile of San Marco were only 5 metres deep, a fact sufficiently interesting to know, considering that the campanile itself rose to the height of 98 metres.

ALFREDO MELANI.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, BOSTON, MASS. MESSRS. HERBERT D. HALE AND G. B. DE GERSDORFF, ASSOCIATED ARCHITECTS, BOSTON, MASS.

HOUSES ON THE BAY STATE ROAD, BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS

HEREFORD CATHEDRAL FROM THE SOUTHEAST.

THIS illustration is copied from the *Architect.* See article elsewhere in this issue.

UNITED STATES POST-OFFICE AND COURT-HOUSE, FERGUS FALLS, MINN. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

[The following named illustration may be found by reference to our advertising pages.]

DOORWAY: HÔTEL DE VILLE, TOURS, FRANCE. M. LALOUX, ARCHITECT; — ENTRANCE: CHAMBER OF COMMERCE, TOURS, FRANCE.

THIS plate is copied from *La Construction Moderne.*

[Additional illustrations in the International Edition.]

ENTRANCE TO HOUSE OF G. B. HARRAH, ESQ., 64TH ST. AND MADISON AVE., NEW YORK, N. Y. MR. MANTLE FIELDING, ARCHITECT, PHILADELPHIA, PA.

THE metalwork here shown was executed by Mr. John Williams, of New York.

THE ARLINGTON HOTEL, MARLIN, TEX. MESSRS. HERBERT & ALLEN, ARCHITECTS, WACO, TEX.

PLANS, SECTION AND ELEVATION OF A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, BOSTON, MASS. MESSRS. H. D. HALE AND G. B. DE GERSDORFF, ASSOCIATED ARCHITECTS, BOSTON, MASS.

DECORATION IN THE SALLE DU TRONE, PALAIS DU LUXEMBOURG, PARIS, FRANCE. PAINTED BY M. HENRI LEHMANN.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

AN EYE-WITNESS ON THE FALL OF ST. MARK'S TOWER.

HOTEL DE MILAN, VENICE, July 20, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

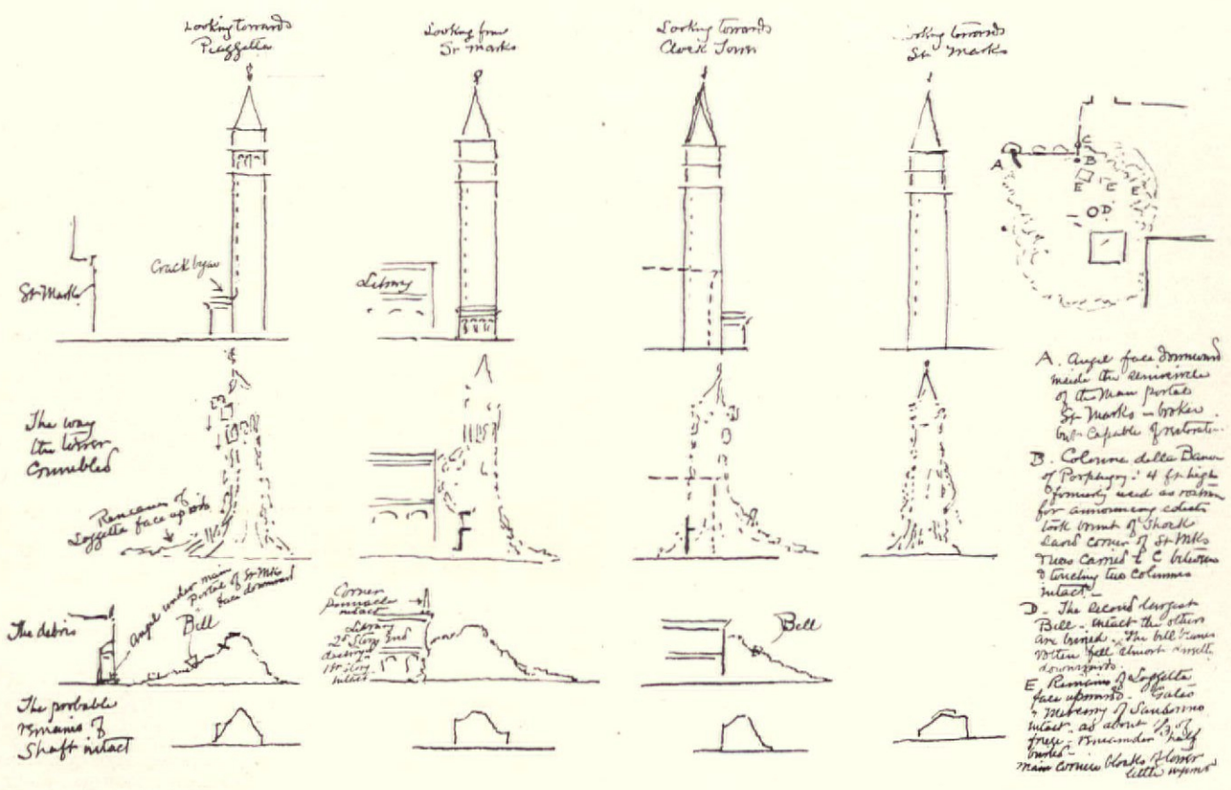
Dear Sirs, — I have telegraphed and written Mr. Peabody asking that the Institute contribute to the reërection of the Campanile. The contributions have been going on here for five days and some $290,000 have been subscribed. By the aid of Francis Wilson, Arlo Bates, who were here, and others, I got together some $800. I have written to London and Paris. The work has been put in charge of Boni, who, as we all know, is the best possible man. Meantime, there are various newspaper accounts of interviews, etc., with different architects; amongst others some American architects, who have laid the fall of the tower to the settlement of the foundation. That shows absolute ignorance of the facts.

I was here, much to my grief. From a distance I saw the angel slowly descend, swaying, but upright, and my daughter and her governess were on the Piazza not 200 feet away. They both say that spurts of lime-dust puffed from the tower about 20 feet up from the ground, and that then cracks appeared at the base in the curtain-walls between the buttresses, which opened upwards with great rapidity, and the base of the tower spread "like the roots of a tree." There was little or no shock. The angel descended in an upright position until the cloud of dust rose and covered it, and must have come down full 100 feet before toppling. When found it was directly under and within the main portal of St. Mark's.

The Italians say the tower "se sedesse" — *i. e.*, sat down upon itself. If there had been settlement it would have leaned. My own impression is this: The top of the tower has been continuously repaired with new material; the bottom less so. The Loggetta concealed the condition of the bottom wall behind it, and it was neglected. The series of windows just inside the corner in order to light the stairs was always a structural weakness in this type of tower. There has been work going on in flashing the roof of the Loggetta, which, while it seemed very slight and harmless under usual conditions, under these special conditions began to show great weakness at this point. This was acknowledged two months ago. The continuous repairs, etc., had produced in the brickwork, certainly of the outside walls, a state to which I can give no better definition than that it was a state of unstable equilibrium.

Energetic, organized action was imperative, and was not taken, from a lack of appreciation of the facts. I very much doubt if any action could have averted the disaster, after the crack, which started at the lowest window towards St. Mark's a week ago, had begun to snap from window to window, all the way up, because shoring-up would merely have transferred the weak point farther and farther up the shaft, and to the right and left on the outer wall. But the miraculous thing is that St. Mark's is absolutely untouched — not a piece of mosaic fallen. The Colume della Banda and the corner columns of the foundation were insecure. Certainly there would have been damage to St. Mark's. The Library has at its end, in the second story, two columns with arches and entablature, torn out. The Gates of the Loggetta, the figure of Mercury, and two of the carved blocks with putte are practically uninjured. The rest are buried still. I sincerely hope that America will liberally contribute. There has been a good deal of talk in Paris that reërection of the old Campanile would not express the present advanced state of architecture, and some say that the Piazza is more harmonious without it. Fortunately, to my mind, no attention is being paid to these remarks. Venice has lost the foil, the contrast to the delicacy of its art. It was a noble foil, and dominated the long lines of the palaces, from every approach. That the form of this vanished monument should be perpetuated is no mistaken conception. I have, on the other side of this sheet, rapidly sketched the past and present conditions.

Yours always, C. HOWARD WALKER.



NOTES & CLIPPINGS

ALCOHOL AS A MOTIVE POWER. — The present price of denaturized alcohol in Germany is 15 marks per hectoliter, or about 13 1-2 cents per gallon. At this price it competes economically with steam and all other forms of motive-power energy in engines of less than 20 horse-power for threshing, pumping, and all other kinds of farmwork, so that a large percentage of the spirit produced in agricultural regions remote from coal-fields is consumed in the district where the raw material is grown. — *The Gas Engine.*

CURE FOR ELECTROLYSIS. — The *Electrical Review* speaks feelingly upon the question of electrolysis, declaring that the time is beginning to arrive when reckoning of a gigantic character is to be had between electric street-railway companies and those who employ buried piping system for various purposes. After treating of the general subject, and going over the methods used by both companies, and showing how the damage is done, the *Review* says that while the current which destroys the pipes may be diminished by increasing the ground-return to the power-houses to the limit of the corporation controlling the situation, it can never be reduced in that way to zero. The remedy, it is declared, is to break up the electric continuity of the piping-system by insulating-joints. A single insulating-joint would stop more current than many thousands of dollars' worth of copper laid in multiple with it, and 20 or 30 properly distributed insulating-joints would reduce the current in a pipe line more than an almost infinite amount of copper would do. This method of preventing electrolysis is well known, and its efficacy is undoubted, but the reason why it has not been adopted is the difficulty in reaching an amiable arrangement between the electric-companies and those maintaining water-pipes. Both sides agree that the insulating-joints should be put in, but each declares that the other should bear the expense. The damage to the pipes undoubtedly comes from the trolley-companies. The companies claim that after they have spent a reasonable amount of money to protect and reënforce their ground-returns, they cannot be legally asked to do more. As there is no legislation upon this subject it looks as if the pipe-line companies would be obliged to do the work, and the sooner they go about it the better for all concerned. At the same time it seems as if in equity the companies should come together, and agree upon some means of protecting the pipes. Certainly the gas-companies should do something to protect their pipes, which do much more damage when leaking than do the water-pipes.

AMERICAN STONE PRODUCTION. — The growing tendency to more permanent structures throughout the country is indicated in the compilation of "*Mineral Resources*" just issued by the Geological Survey, showing that the value of the entire production of stone in the United States in 1901 was $60,982,060, a gain of $12,295,405 over the value of the product of 1900. This great increase in value was shared by all kinds of stone. Limestone, including blast-furnace flux, showed the greatest increase, from $20,354,019 in 1900 to $26,406,897 in 1901, or 30 per cent. Granite showed the next greatest increase, from over $12,000,000 in 1900 to over $15,000,000 in 1901, or over 26 per cent. Sandstone increased from over $7,000,000 in 1900 to not far from $9,000,000 in 1901, about 24 per cent. Marble-production increased to $4,965,699 in 1901, or 16 per cent, and slate-production increased to $4,787,525 in 1901, about 13 per cent. In the order of production, Pennsylvania, producing every kind of stone, ranks first, with a total value of $10,772,288; Vermont is second in rank, with a product valued at $5,366,740; Ohio third, with a value of $5,783,225; New York fourth, followed by Maine, Indiana, Massachusetts and Illinois in the order named, each producing over $2,000,000 worth. The increase in building-stone produced is notable. In 1900 it was valued at $10,672,598; in 1901, at $15,112,600. Crushed stone for road-making and various other purposes increased in value from about $6,500,000 in 1900 to $8,500,000 in 1901. The value of the stone imported into this country for the fiscal year ended June 30, 1901, was $1,276,602, as compared with $1,028,550 for 1900, a considerable increase, of which marble and manufactured marble constituted by far the greatest part, amounting to about $1,024,687. The total value of the stone exported from the United States in 1901 was only $1,672,876, a decrease of about $90,000, as compared with 1900. The chief export was roofing-slate, valued at $950,543 in 1900 and at $898,262 in 1901. — *N. Y. Tribune.*

DANGER FROM ELECTRIC-LIGHTS. — There is a common belief that electric incandescent-lights give out very little heat and that therefore fire-danger from them is practically non-existent. Hence it is that such lamps are frequently found disposed with much unconscious carelessness in the neighborhood of combustible materials, in shop-windows, for example, for decorative effect, and the wonder is that fire-losses from such use of the lamps are not more widespread. Many experiments have been made and recorded to show how real these lamp-fire risks are, and reference to some of them will bear repetition as possibly useful in emphasizing the need of greater caution in securing illuminating effects. In one case where a lighted lamp rested against a vertically-placed white pine-board, a spot about an inch in diameter and of a light-brown color appeared after about 4 hours. In the case of a similarly disposed strip of well seasoned varnished oak, the varnish became blistered in 3 minutes and blackened in about 15 minutes. The wood had the appearance of being charred at and near the point of contact with the lamp, but was not ignited. With a lamp encased in two thicknesses of muslin, the latter became scorched in 1 minute, in 3 minutes gave off smoke, and at the end of 6 minutes, when the muslin cover was removed from the lamp and fresh air reached its interior, it burst into flames. Where a lamp was laid on inflammable material, the effect seemed to be more rapid, due, probably, to the pressure exerted by the weight of the lamp. A newspaper was in this way carbonized in 3 minutes and ignited in 45 minutes. The lamps used were of 16 candlepower. In the instance, cited recently, it was found that on immersing a 16-candle-power lamp in half a pint of water, the latter boiled within an hour. Again, with a lamp buried in cotton-wool, the wool soon began to scorch and ultimately burst into flames. A lamp in contact with celluloid fired in less than 5 minutes. All these trials indicate in a fairly conclusive way what may be expected under certain conditions from a popularly supposed absolutely safe form of light. Intimately associated with the electric incandescent-lamp is the flexible-cord connection, and in this we have a probably even more pronounced form of fire-risk. In two cases recorded some time ago short circuits developed in cords supporting lamps not turned on, and, while the current was almost instantly cut off by the blowing of fuses, the momentary arcs were sufficient to set fire to the cords, which were oily and dirty with lint, being in a cotton-mill. In both cases strands of the fine wire had probably broken and pushed their sharp ends through the insulation, causing the trouble, and both occurrences showed that however quickly current may be cut off by properly acting fuses, the heat of the arc produced is sufficient to make the cords burn. — *Cassier's Magazine.*

SMOKE-EXPLOSIONS IN BURNING BUILDINGS. — How smoke explodes in a burning building was recently shown the Fire Insurance Society of Philadelphia in its rooms in that city by Underwriters' Inspector William McDevitt. Mr. McDevitt set a two-story building, about 3 feet high, on a table. Then he partly filled it with smoke from pieces of burned wood. Thrusting in a gas-jet, a smart explosion followed, and a tongue of flame and smoke 10 feet long shot out of the windows. The inspector also endeavored to make, on a small scale, what firemen call a back-draught, which is really a downward explosion of smoke through elevator-shafts or stairways where there are iron window-shutters; but the roof of his little house was blown off, and the smoke went up instead of downwards. The inspector used only plain wood to produce the smoke for his explosions. Varnished or oiled wood, he said, would have been more effective, as producing more and thicker smoke. Before giving his practical illustrations of the explosive force of hot smoke, he briefly explained the causes of such explosions. In a fire (he said) free carbon rises and mixes with hydrogen; methyl-alcohol, creosote, and other gases are also present in smoke. These gases become heated to the point of ignition, and an explosion is the result. Of itself, smoke would explode at a temperature of from 600 to 800 degrees, but frequently the smoke is ignited by sparks or by coming into contact with a flame. "When the smoke becomes ignited," the lecturer went on, "the interior of the building is instantly converted into a mass of flame. The Hunt-Wilkinson fire strikingly exemplified that. When I first saw the fire great volumes of dense black smoke poured out of the windows. Suddenly there was an explosion, and the smoke was transformed into such a mass of flame as I never saw before." Very thick smoke, when ignited (the speaker said) becomes a pillar of flame, and rolls through a room with such a force as to shake the walls and make the windows rattle. If sprinkled with water, there would be no explosion. Where formerly firemen tried to keep smoke in, under the impression that it smothered the fire, they now immediately break in windows or skylights to let it out. Several ways of preventing such explosions were cited by Mr. McDevitt. In large stores (he said), if an air-shaft of sufficient size were in the centre, there would be no lateral spread of fire. — *Fire and Water.*

DA VINCI'S WORK AT THE SFORZA CASTLE, MILAN. — The Roman correspondent of the London *Morning Post* draws some interesting facts from a volume just published by Signor Luca Beltrami, the eminent Lombard architect, who has done such good work in the restoration of the Sforza Castle at Milan. This volume, entitled "*Leonardo e la Sala delle Asse*," contains an account of the discovery of the Leonardo decorations in the Sala delle Asse, one of the chief rooms in the apartment of Ludovico il Moro, in the Castle of Milan, and explains the method adopted in their restoration. Nearly eighteen years ago Signor Beltrami published a letter written by Gualtiero to Ludovico il Moro in 1498, in which there occurs the following passage: "On Monday the great room of the Asse — that is to say, of the tower — will be dismantled. Magister Leonardo promises to finish it for the end of September." There was nothing to show which room of the castle might be the Sala delle Asse, nor to identify it among the many rooms in the various towers of the castle. Nor could it be proved that the Magister Leonardo was Leonardo da Vinci and not another. For several years it was impossible to make investigations in the castle, because the hall which Luca Beltrami believed to be the hall of the Asse was used as an infirmary for the horses of an artillery regiment. In 1893, however, the hall was evacuated, and a German specialist who was visiting Milan at that time discovered on the vaulted roof of the hall which Signor Beltrami believed to be the Sala delle Asse traces of painting, and a large painted shield, bearing an inscription in gold letters in which mention was made of the alliance contracted in 1496 between Ludovico il Moro and the Emperor Maximilian against Charles VIII — two years earlier than the above-mentioned letter of Gualtiero to Ludovico. Closer examination revealed the general design of the decoration of the hall, the roof of which had been painted to resemble a bower with branches entwined round several shields bearing other inscriptions. The subject and the character of the design left no doubt as to the authorship of the work, which was clearly that of Leonardo. For some years, however, it was not possible to undertake a fitting restoration of the painting, but last year a public-spirited Milanese advocate, Signor Pietro Volpi, provided funds sufficient to enable a young painter of distinguished ability, Signor Ernesto Rusca, to undertake the difficult task. After carefully cleaning all the plaster and noting accurately every trace of Leonardo's composition it was possible to reconstruct and to restore the whole design. — *N. Y. Tribune.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, AUGUST 16, 1902 No. 1390

CONTENTS

SUMMARY: —

Some recent Tests of "Fireproofed Wood." — Some Objections to Metal-protected Woodwork. — Suggested changes in the City-hall Park, New York. — Fall of a Building in Pittsburgh, Pa. — More Rumors about St. Mark's Tower. — Insecure Condition of other European Buildings. — Deaths of MM. Mesdag and Vibert, Painters. — The Growth of the Forestry Movement. — The Iron Market. — Completion of the Assouan Dam. — Result of the "Electrolier" Competition. — Competition for Artistic Advertising Signs. 49

THE AMERICAN VIGNOLA. — VIII. 51

RICHELIEU. 53

THE NEW STYLE OF ART. 55

ILLUSTRATIONS: —

A Competitive Design for the Boston Athenæum, Boston, Mass. — Plans and Section of the Same. — The Greek Orders. — The Château, City and Park of Richelieu, Indre-et-Loire, France.

Pan-American Exposition, Buffalo, N. Y.: Detail of the Stadium; — The Stadium.

Additional: Moana Hotel, Honolulu, H. I. — Main Gateway to the City and Gateway to the Park, Richelieu, Indre-et-Loire, France. — Stable of Wm. A. Read, Esq., No. 128 East 63d St, New York, N. Y. — Interior Views of the Same. — The "Originality" of l'Art Nouveau: Two Plates. 55

NOTES AND CLIPPINGS. 55

A SERIES of tests of wood treated with various fireproofing processes was carried out a few days ago at the Massachusetts Institute of Technology, under the direction of the new Insurance Engineering Experiment Station. An official statement of the results will probably be issued later, but the New York *Times* gives a remarkably intelligent account of them as observed by its reporter. In general, a temperature of thirty-five hundred degrees Fahrenheit seems to have reduced both treated and untreated wood to charcoal rapidly and easily, both of them blazing while exposed to the heat, although the treated wood ceased to blaze in a few seconds after being removed from the furnace, while untreated wood continued to flame for several minutes. In another experiment, intended to test the comparative resistance of the two kinds of wood to this temperature, it was found that it took about a minute longer to reduce the treated wood to charcoal than the untreated wood. At lower temperatures the fireproofing treatment appeared to be more effective. At eighteen hundred degrees Fahrenheit both the treated and untreated woods blazed, and were reduced to charcoal; but, when simply dropped on a red-hot iron plate, the pieces of treated wood merely charred at the point of contact, while untreated wood blazed up, and was consumed. In the final experiment, a block house was built of pieces of each kind of wood, and subjected to fire for five minutes. The treated wood burned where most exposed to the fire, but not readily, resisting for ten minutes before it fell; while the untreated blocks blazed up, and the structure fell in five minutes. In this test, different samples of fireproofed wood were used together, and it was observed that some samples resisted the fire longer than others; but the *Times* reporter says that some sticks simply painted with fireproof paint "withstood the flame fully as well as the woods treated to a fireproofing solution which soaked through the entire stick." In regard to the question whether the fireproofing imparts any objectionable quality to wood, Professor Norton, the Director of the Experiment Station, said that he had found the treated wood much more injurious to tools than untreated wood, both because it was harder, and on account of some chemical action of the fireproofing solution on the steel, which caused the tools to rust very quickly.

MR. GEORGE EDWARD HARDING, of New York, an architect whose extensive experience gives weight to his opinion, opposes the proposed amendment to the New York Building Law, which requires woodwork in buildings more than one hundred and fifty feet high to be covered with metal, instead of being fireproofed by chemical or other treatment applied to the wood itself. Mr. Harding says that in an office-building constructed under his supervision, in which wood fireproofed by the so-called "electric" process was used, the furniture in one of the rooms took fire one Saturday night, and on Monday morning, when the office was opened, although all the furniture was found to have been destroyed, the fireproofed wood doors had confined the fire to the room in which it started. This is valuable evidence, and is confirmed by the opinion of the Chief of the New York Fire-Department, Mr. Croker, who thinks that the adoption of the proposed amendment would add much to the danger of fire in high buildings. Meanwhile, actual tests, like those already made at the Massachusetts Institute of Technology, can alone determine the question whether the treated or the metal-covered wood is preferable, and we venture to say that suggestions from architects on the best way of adapting the tests as closely as possible to the conditions which would be present in actual fires would be welcomed by Professor Norton and his assistants.

THE Municipal Art Society, of New York, has under consideration a scheme for improving the City Hall Park, and consolidating the municipal departments, which promises excellent results. At present, the business of the city is divided between the City Hall, which, while suitable and convenient, is very much overcrowded, the other city buildings in the Park, all of which are more or less shabby, or inconvenient, and various buildings outside, belonging to private owners, for which an aggregate rent of two hundred and ninety-five thousand dollars a year is paid, at the same time that the work of the various offices is separated in a very inconvenient manner. As two hundred and ninety-five thousand dollars a year is equivalent to the interest on more than eight millions, the scheme before the Municipal Art Society proposes, as an actual economy to the city in rent, independent of the economy in time and convenience, to consolidate the municipal business in a single building, or group of buildings, overlooking the Park, but not encroaching on it, while the present buildings on the Park, with the exception of the City Hall, would be removed, leaving the ground open. It has been shown that, apart from the City Hall, the present buildings in the Park cannot be satisfactorily remodelled without such a large expenditure that it would practically be better to pull them down and rebuild them; and, while it is not absolutely necessary to purchase land outside the Park to put them on, the advantage of clearing the space is obvious, and the buildings themselves would be, perhaps, better accommodated north of Chambers Street than south of it. By this plan, also, the plan of Mr. William Barclay Parsons, for improving the access to the Brooklyn Bridge, by providing an arched entrance under some public building on Park Row, could be carried out in the most convenient and artistic manner, as the bridge-entrance would form a principal feature in an architectural group extending around two sides of the Park, to Broadway. The cost of carrying out the scheme would not, it is thought, be much more than the eight and one-half millions, the interest of which is already paid out for rent; so that it would impose no real burden on the taxpayers. It is unnecessary to say that the architectural possibilities of such a scheme are magnificent, and every one interested in municipal art will hope that some way may be found for carrying it out.

THE inhabitants of Pittsburgh were treated the other day to a spectacle which may have lacked charm to some of them, in the fall of a building into an adjoining cellar. Excavations are in progress for the foundations of a large office-building on Sixth Street, and, according to the newspapers, some people passing by noticed that the next building, occupied by a liquor store with offices over it, was "careening" toward the new cellar. The police were notified, and the occupants of the building ordered out. Meanwhile, a crowd of three thousand people gathered, and after waiting two hours, they were rewarded for their patience by seeing the structure fall into the new cellar, amid a cloud of dust. As insurance policies do not cover loss by the fall of buildings, the owner of the collapsed property will, presumably, look to somebody for reimbursement, and the question whether the owner of the new cellar can be held liable will have much interest for the profession.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

THE *Schweizerische Bauzeitung* adds some interesting details to the published accounts of the fall of the Venetian Campanile. The writer of the article, who, some fourteen years ago, ascertained that the tower leaned from the vertical, is inclined to think that the fall may have been due to a failure of the foundation. Time alone, apparently, will decide this question. In any case, the manner of its fall was most fortunate. The Church of St. Mark is less than a hundred feet away, and the Doge's Palace is only about one hundred and fifty feet, so that, if the tower had fallen directly forward, more than two-thirds of its length would have descended upon the church; if it had inclined toward the southeast, at least half its length would have fallen on the Palace, and, if it had inclined to the southward, nearly its whole length would have fallen on Sansovino's Library, which is less than twenty feet away. Instead of this, the masonry settled almost vertically downward, carrying away, according to one account, a corner of the Library, or, according to another account, a corner of the King's Palace, the former Procuratie, which is directly behind the Library. It seems, from the account in the *Schweizerische Bauzeitung*, that the Loggetta was injured, in 1511, while it was in process of construction, by the fall of stones, shaken by an earthquake from the pyramidal top of the tower, then nearly completed; and it was six months before the damage was entirely repaired.

AN epidemic of falling down seems to have attacked the old buildings in Europe; or, possibly, the fall of one very conspicuous one has attracted attention to the condition of the others. The Church of St. John and St. Paul, in Venice, has been declared to be in a dangerous condition, and portions of it may have to be taken down and rebuilt. This building is only about half as old as the Campanile, and, being much lower, is less exposed to decay, and the cause of the trouble remains to be explained. Worse than this, however, the London *Daily Mail* asserts that one of the great porticos of St. Paul's "threatens to collapse," and urges prompt measures for repairing it. Why the porticos of St. Paul's, which carry no important load, and have only stood for two hundred years, should think of "collapsing" is a mystery. We have often been told that the arches and piers which support the dome were in danger, but this might be explained in connection with the thrust of the arches under the weight of the dome, and the disintegration of a portico indicates some serious trouble, presumably with the foundations. It has been suspected that tunnelling in the neighborhood has led to settlements, and the matter will probably be taken in hand now by competent experts.

TWO great artists have died within a few days, Mesdag, at the Hague, and Vibert, in Paris. Mesdag was almost exclusively a painter of sea-pieces, and spent most of his time in his studio at Scheveningen, on the shore of the North Sea, a few miles from The Hague; but good sea-pieces are popular in Holland, and Mesdag, who was business-like enough to maintain a splendid studio in the city, where he could receive his distinguished friends, and show them his works, is said to have amassed a great fortune, which he well deserved. Vibert, who is also said to have gained a fortune by his labors, is much better known in this country than Mesdag, and his gentle satires on ecclesiastical luxury have been very popular here, not only in the original pictures, many of which are owned by Americans, but in reproductions. An element in Vibert's popularity was, undoubtedly, that his pictures were only very mildly humorous, the sarcasm in them sufficing simply to add interest to the splendid groups of cardinals and bishops, in red and purple robes and white lace, drinking out of gold goblets, or sitting in gilded chairs, which he delighted to paint; so that he avoided displeasing anybody in a class of subjects which Courbet's savage ribaldry made offensive to every one.

PERHAPS, no profession ever rose into popularity in this country so rapidly as that of forestry. There are already four regular schools of forestry here, in New York, Minnesota, North Carolina and Ohio, besides several summer schools, to which only those students are admitted who possess a good preliminary training; yet the demand for trained foresters already far exceeds the supply, and is fast increasing. It is said that, in the United States alone, more than two million acres of private woodland are under the charge of trained foresters, in addition to the tracts belonging to the State and General Governments; and twenty skilled foresters have been called for to go to the Philippine Islands. What will be the result of the movement remains to be seen, but it is hardly possible that a system which has, in a hundred years, added immensely to the wealth of Germany should not be of even greater benefit to the United States. It is curious that one-third of the students in the Yale Summer School of Forestry are women; and, although a great many women attend summer courses rather as amateurs than with any definite object, it is very possible that the profession may, in this country, be found to suit the sex which excels in accurate and scientific observation.

THE iron market in this country shows some peculiar irregularities. While the demand for structural steel seems to be as urgent as ever, the plate-mills, which, not long ago, could not supply their customers, now find business comparatively dull. The tin-plate factories are said to find their product accumulating on their hands, and are already struggling with their workmen over a twenty-five per cent reduction in wages. Meanwhile, imports of steel and iron continue, notwithstanding the enormous duties. A wire-mill in Connecticut is said to have made contracts for eleven thousand tons of steel billets, part from the Dominion Iron and Steel Company, of Cape Breton, and the rest from Germany.

THE great dam across the Nile, at Assouan, is completed, and the next season will witness the results of the control of the Nile inundations which it is designed to give. The primary purpose of the undertaking was to enlarge the area of cultivation in the Nile Valley, as well as to permit two crops a year to be taken from ground which now only affords one; and it seems probable that both these objects will be satisfactorily attained; while it is not impossible that the great addition of moisture to the soil and air of Egypt may still more increase the rainfall, already developed by the comparatively insignificant modifications in irrigation and cultivation, so as to change the climate of the region lying between the area of ordinary inundations and the desert. The whole cost of the works, as contracted for, is only about twenty-three million dollars, or less than one-thirtieth of the direct expense of the South African War, and it may safely be predicted that Great Britain will derive a thousand times as much credit and influence from its operations at Assouan as from those in the Transvaal.

MUNICIPAL AFFAIRS gives the result of the competition of the New York Municipal Art Society for a design for an electrolier, to be placed on the "islands" which the city authorities propose to establish, to divide the traffic in the more crowded thoroughfares. The first prize, of five hundred dollars, which includes compensation for making details for execution, was awarded to Mr. Victor A. Ciani; the second prize, of one hundred dollars, to Mr. Henrik Wallin; the third prize, of fifty dollars, to Messrs. Wilkinson & McGonigle, and honorable mention to a design by Miss Edith W. Burroughs. Mr. Ciani and Miss Burroughs exhibited their designs by models; the others by drawings only.

WE think we have already mentioned the competition for artistic advertising signs, to be held in Paris in October, following the example of the one carried out a year or two ago in Belgium. The competition is open only to French citizens, and may include actual signs, or designs for them, in any medium, and of any size. A jury of thirty-three members will make the award, and very liberal prizes are offered. The first prize is six hundred dollars; there are two equal second prizes, of four hundred dollars each; four prizes of two hundred dollars each, and eight prizes of one hundred dollars each. Besides these, the prize designs are understood to remain the property of those submitting them, and may be marked with the price at which they may be purchased by any one desiring to use them. Competing designs must be delivered at the Petit Palais, Champs-Elysées, Paris, between ten in the morning and five in the evening, on any day from the sixth to the eleventh of October. Signs already in use cannot be admitted, as the object of the competition is to encourage the production of new designs.

THE AMERICAN VIGNOLA.[1]—VIII.

PART I.—THE FIVE ORDERS.

THE GREEK ORDERS.

ALTHOUGH the different examples of the Greek Doric and Ionic Orders differ considerably among themselves, both in the proportions of the Columns and in the treatment of details, the proportions of the Entablature are tolerably uniform and are, in general, the same for both Orders, the Architrave and Frieze being both about three-quarters of a Diameter in height and the Cornice about half a Diameter (119). The Entablatures, as has been said, are about two Diameters high, however tall or short the Columns may be. Their chief characteristic is the height of the Architrave and the shallowness of the Cornice. The Diminution and the Entasis of the Columns begin at the bottom of the Shaft.

THE GREEK DORIC.

The Greek Doric has no Base, the Shaft standing upon three large steps, the upper one of which is called the *Stylobate* (113). It has generally twenty Channels (114), which are generally elliptical in section, but some small Columns have only sixteen, or even, as at Argos, fourteen (115). In a number of examples an Arris comes on the axis of the Column instead of a Channel, as is seen both at Argos and at Assos (116). Instead of an Astragal, a groove, or *Sinkage*, separates the Shaft from the Necking of the Capital, and the Channels are carried past it quite up to the Fillets at the base of the Echinus (44, 116). These Fillets vary in number. They are not vertical on the face, but follow and continue the slope of the Echinus, and their upper surfaces also are bevelled (117). The Echinus itself has an elliptical or hyperbolic profile, the earlier examples being the most convex and the later ones hardly differing from a straight line. The Abacus has no mouldings.

The Architrave also is plain, and is crowned by a Tænia, below which is a broad Regula and six short Guttæ. In the earlier examples the face of the Architrave is set just over and in line with the upper Diameter of the Shaft, but in the later ones it overhangs, coming over the lower Diameter, and the Echinus is made steeper, as well as straighter, as has been said, as if to support it.

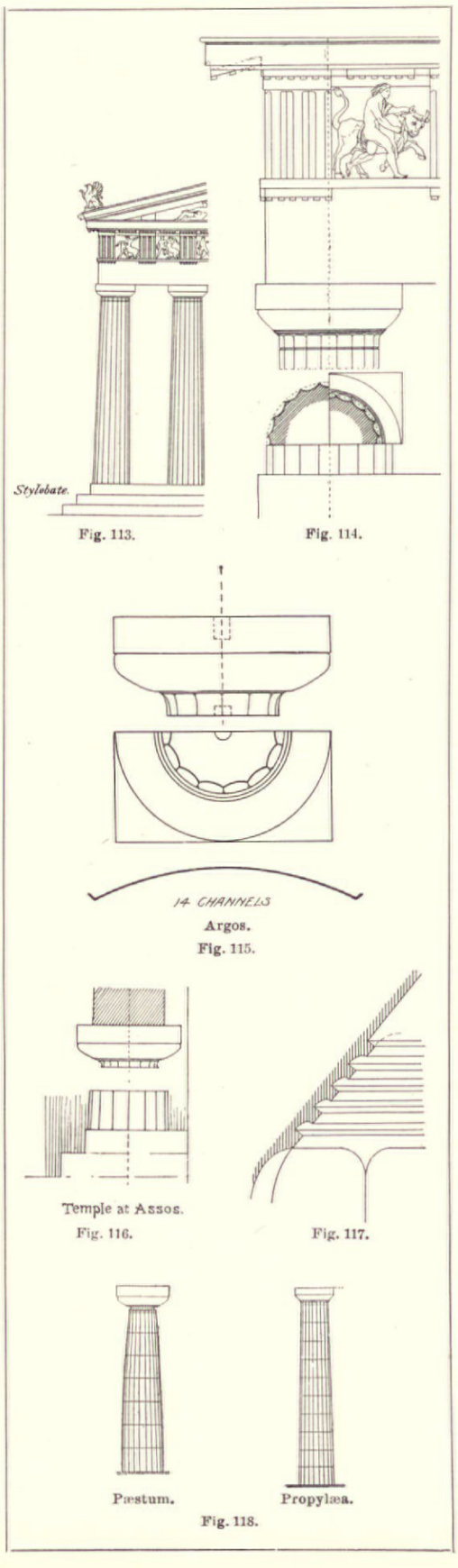


Fig. 113. Fig. 114.

Argos.

Fig. 115.

Temple at Assos.

Fig. 116. Fig. 117.

Pæstum. Propylæa.

Fig. 118.

The Triglyphs in the Frieze are shorter and broader than in the Roman Doric, and are set flush with the Architrave below, the Metopes being set back. They are also thicker than the Roman Triglyphs, and the Channels are deeper, those at the edges cutting back at an angle of 45 degrees, the others generally at 60 degrees, and they run nearly up to the broad Fillet, or Band, that constitutes the Cap of the Triglyph. This is only as wide as the Triglyph itself, not breaking round the corners, and it is not continued between the Triglyphs, the Cap of the Metopes being narrower.

As in Vignola's Denticulated Doric, the Mutules on the Soffit of the Corona slope up, and have only eighteen Guttæ, and they occur over the Metopes as well as over the Triglyphs. The Mutules are thicker than those in the Denticulated Doric, though not so thick as in the Mutulary. The Cymatium generally consists of an elliptical Ovolo and a Fillet, the Soffit of which is bevelled. But different examples vary in almost every one of these particulars.

At the corner of a building the Triglyphs are set, not over the axis of the Column, but at the extreme end of the Frieze, two coming together and making a solid block (44, p. 53). As the Metopes do not vary in size, being nearly square, this brings the three corner columns nearer together than the others.

In the best Greek examples, the columns all slope in a little, so that the corner column, which is a little bigger than the others, has its inner face nearly vertical. The horizontal lines curve slightly, being convex up, the vertical faces incline a little, either out or in, and the mouldings are, as has been said, generally elliptical or hyperbolic in section, rather than arcs of circles.

The Columns vary in height from about five to eight Diameters, the earlier ones being the shortest, and the Entasis, or curvature in the outline of the Shaft, and the Diminution in the width of the Shaft, from bottom to top, which sometimes amounts to one-third of the Diameter, are much more pronounced in the earlier examples than in the later ones (118). This seems to show that the original of the Doric column was not a wooden post, as

[1] Continued from No. 1375, page 37.

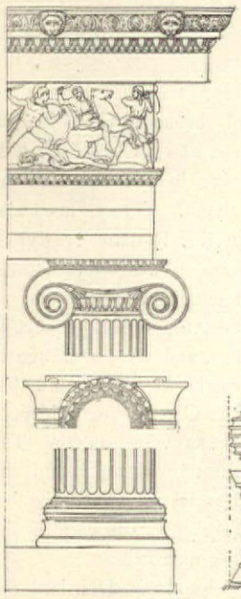


Fig. 119.

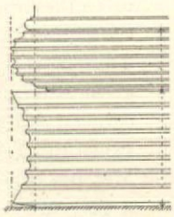


Fig. 120.

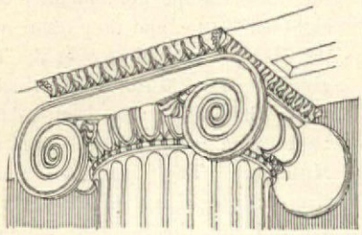


Fig. 121.

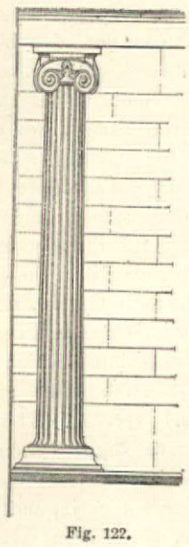


Fig. 122.

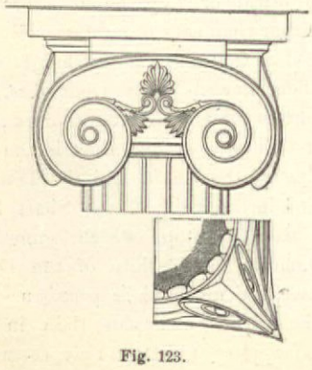


Fig. 123.

has been thought, nor a pile of masonry, but a piece of rubble-work, probably, like the rubble walls, covered with stucco.

THE GREEK IONIC.

The general proportions of the Greek Ionic Entablature are, as has been said, about the same as in the Doric, but the Columns are more slender, varying from about seven Diameters in height to more than ten, and the Architrave, Frieze and Cornice are often made very nearly equal in height (119).

The Base is like the Attic Base, except that the Scotia is larger, constituting the principal feature, that the upper Torus is larger than the lower one, that the Fillet above the Scotia projects as far as the face of this Torus, and that there is no Plinth. As the Base is still half a Diameter high, the upper Torus and Scotia are very much larger than in the Roman Attic Base. The lower Torus is sometimes very small indeed, and is occasionally omitted altogether, as at Samos (120) and in one of the Choragic columns on the south side of the Acropolis at Athens (66).

The Shaft is fluted just as in the Roman Ionic, having twenty-four channels, and the Capital resembles in general Vignola's Capital with Balusters. But the Scrolls are much larger, measuring a full Diameter and a half from side to side, and two-thirds of a Diameter from the Architrave to the bottom of the curve. The Capital, measured from the Architrave down to the Astragal, is half a diameter high, instead of a third, the Abacus is very small, consisting generally of a single Ovolo, and the *Cushion* between the Abacus and the Echinus very wide, its lower outline being curved downward (121). The sprigs of honeysuckle, accordingly, do not cover the eggs and darts, five of which are visible between the Scrolls, instead of three.

The Architrave is sometimes plain, sometimes divided into two or three bands. The Frieze, or Zoöphorus, is wide, and the Bed-mould which crowns it is often countersunk into the Soffit of the Corona, so that it does not show in elevation (119). It is noticeable that though Dentils are, historically, a distinctively Ionic feature, they are omitted in many Greek examples. The Cymatium is a large Cyma Recta, and has a Fillet and Bead below it, which is sometimes undercut so as to make a little Beak Moulding.

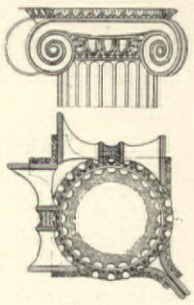


Fig. 124.

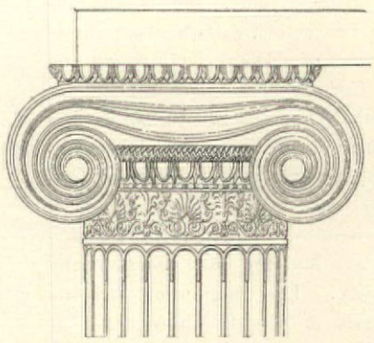


Fig. 125.

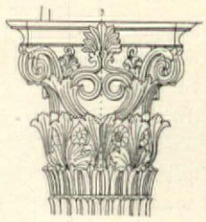


Fig. 126.

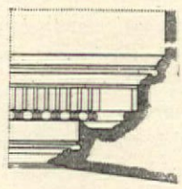


Fig. 127.

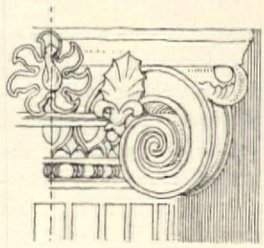


Fig. 128.

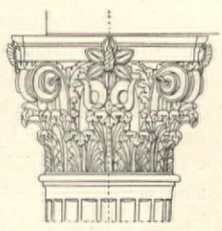


Fig. 129.

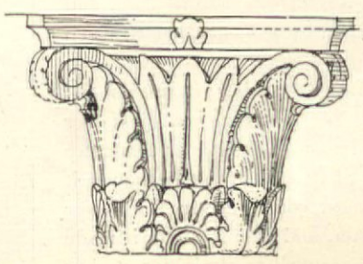


Fig. 130.

But here, as in the Greek Doric, there is a great variety in the details of different buildings.

The four faces of the Capital are sometimes made alike, with double Scrolls on each corner, as in the Roman Ionic, and these Scrolls are sometimes connected under the Abacus by a continuous curve, convex up, instead of by a horizontal line (122, 123). Sometimes a corner column shows Scrolls on the two outer faces and Balusters on the two inner ones, the double scroll on the corner projecting at 45 degrees (124). Some examples have a wide Necking, adorned with the honeysuckle ornament, below the Echinus (125, 135).

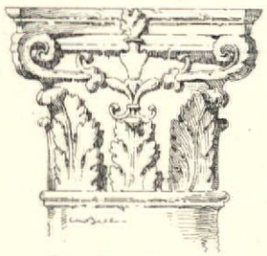
A few Corinthian Capitals are to be found in Greece, but the buildings in which they occur are in other respects Ionic, or even Doric (126).

In the later Greek Colonies in Southern Italy are found interesting varieties of all the Orders.

Their most marked peculiarity is the treatment of the dentils (127). The Triglyphs and Dentils are long and slender, and the mouldings refined in outline and sometimes separated by deep grooves, rectangular or circular, which are not to be mistaken for mouldings. The Architraves lose their importance, the Ionic Scrolls are much diminished in size, and the egg-and-dart moulding is changed into what are sometimes called Filberts (128). The Corinthian Capitals receive a local development quite unlike that which was finally adopted in Rome itself, as may be witnessed at Tivoli (129), Pompeii and Herculaneum (130). Since the revival of Grecian architecture other variations have appeared in France, Germany and Italy (131, 132).

From the Boulevard des Filles de Calvaire Paris

Fig. 131.



From the Portico by Bramante S^t Ambrogio - Milan -

Fig. 132.

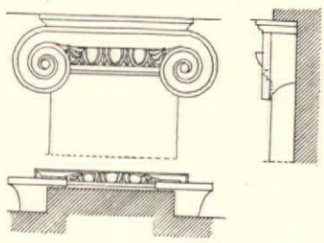


Fig. 133.

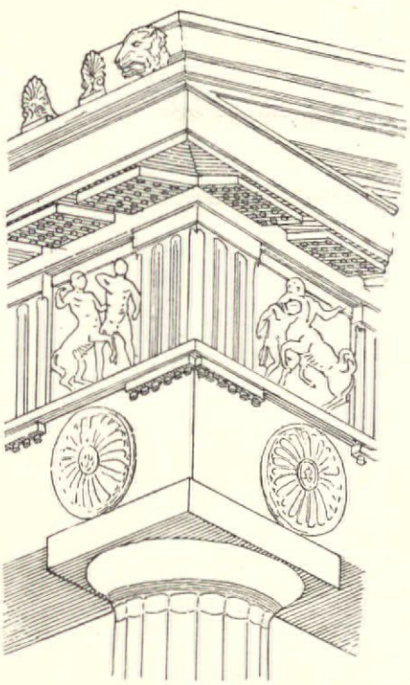


Fig. 44.

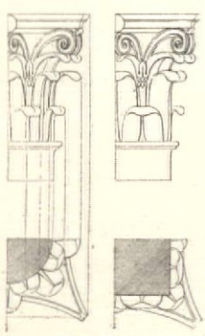


Fig. 134.

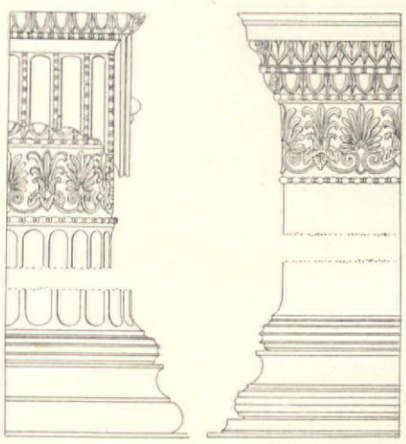


Fig. 135.

PILASTERS.

The Romans made their Pilaster Capitals resemble those of the Columns. This works well, except with the Ionic Capitals, in which the projecting Echinus presents an almost insuperable difficulty (133).

As Pilasters do not generally diminish in width at the top, their Capitals are one-fifth broader than those of the Columns. But Pilasters are often made half a sixth narrower than the Columns at the bottom, and half a sixth wider at the top, having thus a uniform Diameter of five-sixths and a half. In the Corinthian Pilaster Capital, the extra space is taken up by making the leaves a little broader, and setting them farther apart (134).

The Greeks gave their Pilasters Bases like those of the Columns, but Capitals of their own, composed of a series of mouldings (135).

W. R. Ware.

[To be continued.]

RICHELIEU.

THE authors of the various papers on city-planning, both here and abroad, *vide* the recent *Transactions of the R. I. B. A.* and the "Beautification of Washington," have all failed to mention one of the earliest and most interesting examples of a city built on a prearranged plan by a single architect.

Washington and Annapolis, in this country, and Wren's plan for rebuilding the burnt districts of London have all been given consideration; but the little town in the middle of France, built by and named after the famous Cardinal, has not even been mentioned.

Richelieu lies in the midst of a barren plain some distance from the modern railroad-station. The present approach to the city is dull, uninteresting, prosaic; but when once we stand at closer range, under the shade of the old alleys of trees surrounding the city walls, the imagination runs riot. Nothing is changed, — the old moat is still half-filled with water and the quaint towers for the Mousquetaire defenders still retain their loopholes, while the city gates, though now without their drawbridges, are charming architectural compositions.

One can fancy the interest with which the grim old Cardinal planned this toy city. The impression is of a scene in a theatre, and one would not be in the least surprised to see His Eminence drive out or D'Artagnan and his companions loitering in the archway. Every view affords a setting for the characters of Dumas.

Standing at the principal entrance, we can see, down a clear vista through the heart of the city, the corresponding gate on the opposite side. It seems but a stone's-throw away, and indeed, is but a thousand paces.

There is no thought of radial avenues, the whole city being laid

out on a simple rectangular plan. The extreme length measures about 960 paces, and the width 360, approximately. The principal street is on the main axis, with two minor streets parallel to it. These, together with three shorter transverse streets, two of which traverse the two public squares, form the arteries of the city.

The houses are all alike, except that the buildings on the street-corners are a story higher than the others. The streets are not long enough to make this arrangement look too monotonous, but are, at the same time, sufficiently long to make the public squares the centres of interest. These squares are planted with trees in the most approved Republican manner, as seen everywhere in France.

The houses, except the corner ones mentioned above, are two stories high, in the familiar Henri IV style, with stucco walls and stone quoins and high slate-roofs broken by dormers. The cornice-line is brought down lower on the buildings around the public squares, making half-dormers of the upper stories. This makes the cornice-line of the squares lower than that of the principal street.

The church and market are the most conspicuous buildings, the church being of a seventeenth-century Jesuit type, and the market, a picturesque but unpretentious structure.

The ground on which the city is built is perfectly level, with a sufficient fall to the streets to drain everything to the centre of the town.

Richelieu was founded in 1631, some ten years after the commencement of the neighboring château in the park of His Eminence the Cardinal Duc of Richelieu.

a collection, to which Lopez, the Moorish Jew, and the most celebrated merchant of antiquities of his time, contributed no small part.

In 1642, the château was finished. In 1631, the Cardinal obtained letters-patent, authorizing him to found, adjoining his château, a city to bear his own name. He agreed to institute four fairs a year and, in order to facilitate access to them, dug a canal from the Vienne.

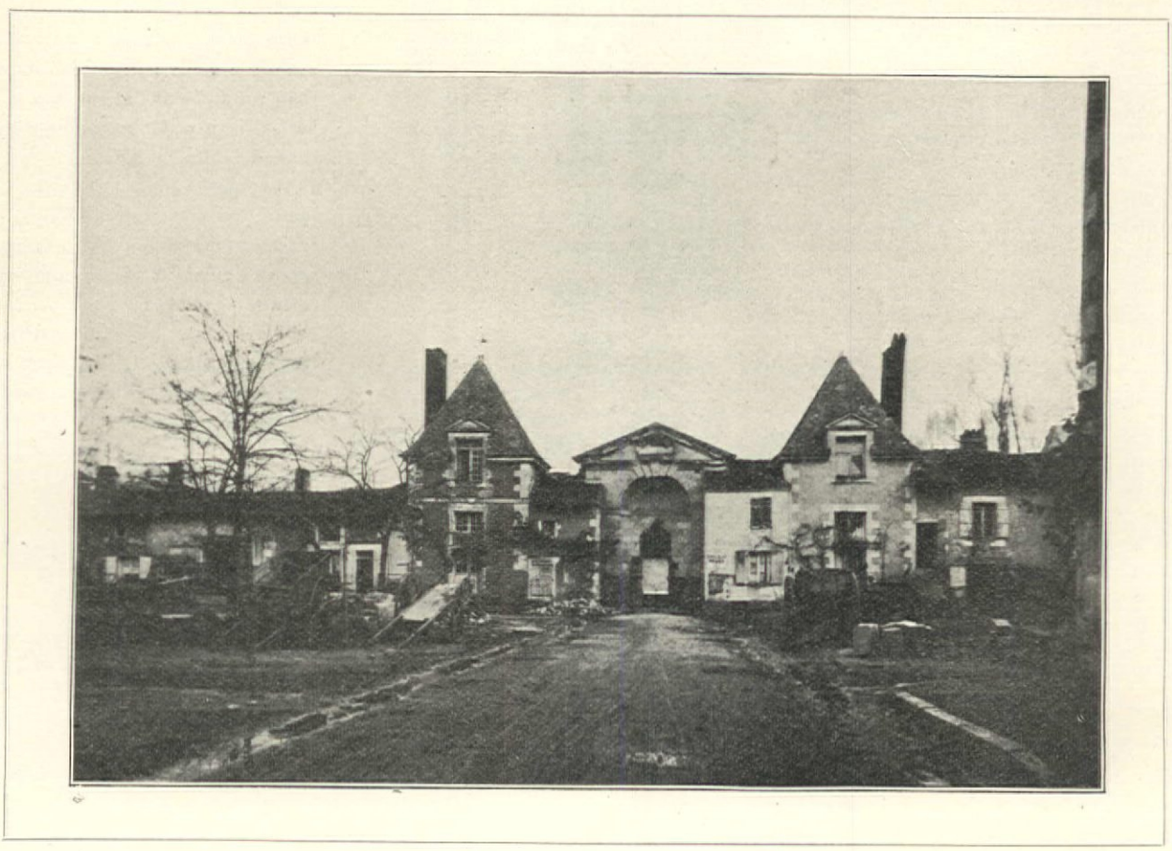
In 1639, probably at the Cardinal's request, the Pope suppressed a neighboring *cure* and installed it here. It was served by the priests of the Mission of St. Vincent de Paul. Lemercier built them a church and a charitable hospital.

For the civil administration of the new city, the Cardinal appointed various magistrates and officers, who were each obliged to build his own house at his own expense and, as it seems, according to Lemercier's designs.

The city was walled, a market and auditorium constructed and, in 1633, the twenty-eight houses of the main street, fourteen on each side, were nearly completed. The Cardinal's superintendent, de Sourdis, wrote to him: "The houses of the principal street are marvellously advanced and they are the prettiest things in the world to see. It lacks only five houses to finish it."

Finally, to complete this ideal city of the Renaissance, the Cardinal decided to build an academy and obtained a charter for the establishment of a Royal College.

He had hoped to have the King visit it, but it is said that he himself was so occupied by politics that he died without having seen the completed city on which he had expended so much money and so



One of the Small Gateways: Richelieu, Indre-et-Loire, France.

It is said that the Cardinal began this princely dwelling because he was envious to surpass the Châteaux of Champigny-sur-Veude and Bonnivet in this same Province of Poitou. Whether His Eminence was guilty of jealousy or not, the fact remains that, through his political influence, the Château of Champigny, the heritance of the famous Mademoiselle de Montpensier, was demolished. He attempted to tear down the chapel as well, but was defeated in this purpose through the intervention of the Pope. The histories give this affair as preliminary to the erection of his own château and then proceed to mention the employment of 2,000 workmen upon his palace and gardens. The men were under the direction of another Cardinal, François d'Escoubleau de Sourdis.

Richelieu's architect was also the King's, Jacques Lemercier. The problem given to him was to preserve in the magnificent buildings, of which the Cardinal had conceived the plans, the room in which His Eminence had been born, — to permit, in other words, the ministerial pride to view at pleasure the contrast between the splendor of his old age and the humbleness of his beginnings.

That this plan was detrimental to the arrangement of the interior of the château, all of its admirers have agreed, but, still, though the building was not a model of convenience, it was a veritable treasury of art. Decorated by Poussin and by Prévost, it was filled with the antiquities which Mazzarin, then a simple abbé, purchased in Italy, much thought. Indeed, there are on record only two visits of the Cardinal to his château.

At Richelieu's death, the château passed to his family. The last Duke was an *emigré*, and in 1793 the château was confiscated. In the Year XI, however, the Duke's name having been eradicated from the proscribed list, the château was restored to him; but he feared to return to France and sold the building to speculators, who immediately began to demolish it for the stonework. Napoleon made an attempt to purchase it for military purposes, but was unsuccessful, and, to-day, there are few farmhouses in the district which have not been repaired or constructed with the stonework of the château. The collections are scattered all over Europe.

As a city, Richelieu is a failure. It remains as it stood at the time of the Cardinal's death, with buildings unfinished and even the escutcheons on the completed buildings uncarved. Not a single house has been added and only the establishment of the *cure* and the building of the church have saved the city from desertion.

The Cardinal had not considered the real factors in the growth of cities; and the attempt to establish a business community at a point which was neither on a navigable river nor a great trade-route was, of course, predestined to fail.

To-day the only sounds that greet the ear in Richelieu are the noise of one's own footsteps and the splash of the water in the fountain

of the public square. The only traces of inhabitants are, here and there, white-bonneted peasant-women knitting in a courtyard or a couple of peasants drowsing in front of a café.

Thus, the little city all but deserves the name that has been given it — it is called the "Pompeii of France." W. T. PARTRIDGE.

THE NEW STYLE OF ART.

"FOR many years it has been the aim of certain architects and designers to create a new style of art that would be characteristic of the age, or, at least, different from the familiar work of the other periods. So long as this effort was conscious and predetermined it failed, as it was bound to. Broadly viewed, man's works, like his character, are not what he would have them, but reflections of himself, his mode of living and thought. To this, in the case of architecture, is added the formative or restrictive influence of the materials at his command and the climate under which he lives.

"Coincident with these fruitless efforts toward acceptable novelty the application of iron and steel to building-construction has, in this country, changed the skyline of large cities from a uniformity of five or six storied buildings, broken only by spires and towers, to a cyclopean jaggedness in which the spires are dwarfed to insignificance; and a few years more at the present rate will restore the uniformity at the high level of twenty or twenty-five stories.

"This is to premise the axiom that true growth is natural and spontaneous; and so when least expected, when the pernicious stimulators, whose bombardment of the skies brought no rain, are wearying of their labors there comes from the Old World, as all other styles have come, a new note — the expression in a new way, of a new point-of-view. What we call it is of no consequence; succeeding generations will give it a name. Whether work of allied Arts and Crafts, l'Art Nouveau, or simply New Art, it is at its best a worthy fruit of rational methods, deriving its inspiration from nature and accepting and declaring the nature of the materials. Such was the 'Gothic' when it was born; that wonderful combination of greatness and littleness, of the architect and the stone-carver. Such has been every true style. Doubtless, those times had their conservatives who scoffed at the innovations which rolled over them into history. We have them to-day and they will not recognize a style nor a form that has not had volumes written about it, the words of whose writers are their only source of knowledge. They are the dilettanti — the critics — and their gospel is literature, but it is not art. Art is vital, it lives and works; its history and expounding are matters apart.

"We all admire the old work; we treasure and copy it, and we would not be deprived of it; but if our appreciation is broad and catholic this admiration does not preclude a healthy forward impulse.

"That impulse has arrived; it has leavened the whole body of European art and industry. The Paris Exposition of 1900 was its challenge to the world. It may be that some individual notes of that challenge were extravagant and discordant; these excesses are the reaction from the paucity of recent years, but they should not obscure the perception of the merit and elegance that characterize the better work, work which fittingly marks the dawn of the twentieth century." — *The Jewelers' Circular.*

NEWBURYPORT, MASS., July 30, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I have read with interest your comment on originality, and the resulting correspondence in this week's issue of the *American Architect.* Apropos of this I send you an article which I wrote for advertising purposes, and which was recently published in the *Jewelers' Circular.* Being written for advertising purposes, the style of this article is not, perhaps, just what I would make it in disinterested comment; but I would not to any degree change the sentiments expressed.

I do not know that l'Art Nouveau needs defending, and I certainly would not defend some manifestations of it; but it seems to me that its relation to the accepted styles should be defined; and I do not remember having seen such definition. As a contribution to this subject, I hope this will interest you; and it may move you to a fuller exposition of the matter.

Very sincerely yours, GEORGE P. TILTON.

[MR. TILTON, whose article, "written for advertising purposes," — and it is a pity that more advertising matter has not its character — is published above, is not the only correspondent who has taken us seriously to task on the supposition that we were having a fling at l'Art Nouveau — Heaven bless the name — whereas we were simply chiding those who make originality the prime objective of their artistic endeavor. The man who sets about his work with the single intention of being "original" will inevitably produce upon the onlooker the same effect that Dr. Holmes produced when he sat down "to write as funny as I can." A confirmation of the belief here expressed will, we believe, be found in the illustrations we reproduce this week from the pages of *Architektonische Monatshefte,* which has assumed the rôle of champion and promoter of l'Art Nouveau — after the German interpretation, be it understood. There is a good deal that is attractive in some of the manifestations of l'Art Nouveau where a designer of real ability applies its rules — if there be any such — to problems in whose solution it is proper to apply them, but we have seen woefully little evidence as yet that structural architecture affords a proper field for their application. The punching of a façade full of seventeen different kinds of openings — none properly structural — and wilfully calling them doors and windows is not the execution of an architectural design. Nor is the giving to outlines and projections the *molle* curves and surfaces which invite the rain to keep the wall continually saturated with moisture, because there is no proper "drip" to the projecting features, good construction; nor is the substitution of soft and meaningless shades for bold shadows necessarily a proof of genius in architectural design. The whip-lash line — the distinguishing line of l'Art Nouveau — with its unequal flexions and suddenly reversing turns and twists, is a ductile, not a structural, line; it has no static value, as an architectural line should have. It is admirably in place in jewelry, in some of the minor applications of wrought metalwork, and is excusable in furniture, since every one knows that there the static form, the stability, is due to fish-bones and horse-hoofs, and it doesn't make much difference how form and material are vilified. But architecture has a greater dignity than jewelry or furniture and deserves greater respect than it usually receives at the hands of originals and the inventors of new styles. We thoroughly believe in progress, but not at the expense of precedent. — EDS. AMERICAN ARCHITECT.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, BOSTON, MASS. MR. STEPHEN CODMAN, ARCHITECT, BOSTON, MASS.

PLANS AND SECTION OF THE SAME.

THE GREEK ORDERS.

SEE article "The American Vignola" elsewhere in this issue.

THE CHÂTEAU, CITY AND PARK OF RICHELIEU, INDRE-ET-LOIRE, FRANCE.

FOR description see article "Richelieu" elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: DETAIL OF THE STADIUM; — THE STADIUM. MESSRS. BABB, COOK & WILLARD, ARCHITECTS.

[Additional illustrations in the International Edition.]

MOANA HOTEL, HONOLULU, H. I. MR. O. G. TRAPHAGEN, ARCHITECT, HONOLULU, H. I.

THIS frame building, containing about sixty bedrooms, is located on the beach at Waikiki, a suburb of Honolulu. The entire first floor is devoted to the offices, parlors, reading-room, billiard-room, buffet and lanais, or verandas, the dining-room and culinary department being located in a semi-detached building overlooking the ocean. The building is equipped with its own electric-lighting plant, and an electric elevator communicates with a large open roof lanai, from which a magnificent view may be had.

MAIN GATEWAY TO THE CITY AND GATEWAY TO THE PARK, RICHELIEU, INDRE-ET-LOIRE, FRANCE.

SEE article "Richelieu" elsewhere in this issue.

STABLE OF WM. A. READ, ESQ., NO. 128 EAST 63D ST., NEW YORK, N. Y. MR. WM. H. BEERS, ARCHITECT, NEW YORK, N. Y.

INTERIOR VIEWS OF THE SAME.

THE "ORIGINALITY" OF L'ART NOUVEAU: TWO PLATES.

IN connection with remarks we make elsewhere on the "New Art," we reproduce these illustrations from *Architektonische Monatshefte.*

NOTES AND CLIPPINGS

PERHAPS THE LARGEST TREE IN THE WORLD. — What undoubtedly is the largest known tree in the world has been discovered on the Government reservation far up in the Sierras, in California. Six feet from the ground it took a line 150 feet 8 inches long to encircle the tree, making it about 51 feet in diameter. — *Exchange.*

HICKORY PINE AS A FOREST-MAKER. — In writing upon methods of conserving the water-supply of the country, in *Forestry and Irrigation,* T. P. Lukens says there are two ways of reaching the result, namely, to build storage reservoirs, and to clothe the mountains with trees and

see that they are not destroyed again. Even to build the reservoirs would be useless, unless the water-sheds tributary to them be forested, as the reservoirs would soon become filled with silt if the mountains were bare, so the only hope would be to bring back the forests. He declares that it is easy to perpetuate a forest by planting another in its place when a tree is removed. All conditions are favorable then, but after repeated fires over the length and breadth of the mountains the conditions are not favorable for tree-growth. The tree best fitted for reforesting, he says, is the hickory pine (*Pinus attenuata*), which grows on fire-swept slopes from San Bernardino to Shasta, in California, which he describes as follows: "Not many travellers ever see it, and of those that do but few would notice it except for its strange appearance which its life-store of cones give it. The tree is usually small, early bearing, found on sunny slopes of the Cascade range to the northern Sierra, and southward (rarely on the coast ranges) to the San Bernandino Mountains. Its cones grow in circles, strongly defined, narrow and pointed. They are 3 to 8 inches long, and remain on the trees unopened for an indefinite number of years. The outer scales have conical, quadrangular tubercles, terminated by a very short, triangular, firm prickle. The leaves grow three in a sheath, 3 to 7 inches long. A peculiarity of this tree is the tapering character of its cones at the base, whereby they oppose so little resistance to the growing trunk that the annual layers, instead of crowding off the cones (as in most other species), often envelop them completely. They are sometimes found in large trunks still unopened and the seed good. The cones are borne in whorls, first around the main axis of the tree only. As the tree grows and branches freely, which it will do where not crowded, then cones are borne about the limbs. I have counted as high as 500 cones on a tree 50 years old, each cone containing 124 fertile seeds, which are small, there being 20,000 to the pound. The seed has a wing 1 inch long and one-fourth inch wide. When a fire sweeps through a grove, if severe, it kills the tree. The heat melts the resin with which the cone is sealed, and the second or third day after the fire the winged seeds take flight and plant a far greater area than existed before. Thus, after each fire the forest becomes dense, crowding together for protection until at last they defy the fire, for where they grow so closely together as to occupy all the ground, they will resist fire. This persistence of cone, coupled also with the firm coherence of their scales for an indefinite length of time, is an important fact, for it ensures better propagation, if not the very existence, of the species. It is found that the seeds in these long, closed cones are always in good condition, however old the cones. They seem to declare not only that this species of tree shall be its own survivor, but also that it may extend its dominion over territory which has been cleared of trees. So we may expect that through the improvident or wanton conduct of man, while it destroys by fire the noble sugar and yellow pines of our vast forests, this cunning little provident tree, fighting now for room to stand upon and crowding close together for greater strength, shall, after long waiting and at last fire-killed, unlock its store of life germs and scatter them with sailing wings on the wind to reforest the mountains. No tree shows more greenness or symmetry of growth than the *Pinus tuberculata* when not crowded. Its desire seems to be to cover the ground, if not in numbers, then with wide-spreading branches. Trees are to be found 150 feet high, with a body 2 to 3 feet in diameter. I have never found one of them dying from old age. They thrive where other trees would not attempt to grow — on the steep, hot, rocky slopes. Their roots penetrate every little crevice to an incredible depth, opening channels for the conservation of water and mulching the surface with their foliage."

Art-study in Italy. — His Majesty's Chargé d'Affaires at Rome has sent to the Foreign Office the law regulating entry without payment of the ordinary fee to the national museums, galleries, excavations and monuments of Italy which has been approved by the royal decree of April 13, 1902. The privilege of free entry is by the law accorded to foreigners who are (*a*) artists, (*b*) art-students and art-critics who have issued noteworthy publications, (*c*) professors of archæology, history, literature and art; (*d*) pupils of archæological, historical and art institutions; students in departments of literature and philosophy and in schools of practical engineering. Applications for a general permit for free entry to all museums, etc., must be sent to the Ministry of Public Instruction on stamped paper of 1 lira 20c., with an unmounted photograph of the applicant, not to exceed 5 centimetres by 8 in size. Applications for free entry to archæological and artistic institutes in a single town must be sent on stamped paper of 60c. to one of the heads of the institutes, and if the permit is required for more than a month a photograph must be sent of the size mentioned above. The applications must be accompanied by the following documents: For persons under (*a*) and (*c*) by an academical document *visé* by the Italian diplomatic representative or Consul in the country to which the applicant belongs, or by the diplomatic representative of that country in Italy. For persons under (*b*) by one of the publications which they have issued. For persons under (*d*) by an official document showing that they stand on the books of the institutions mentioned under that heading for the year in which they apply. The document must be *visé* as in the case of documents furnished by persons under (*a*) and (*c*). As his Majesty's diplomatic representative at Rome is not always in a position to authenticate without previous inquiry documents issued by institutions in the United Kingdom, art-students, etc., are recommended to have such documents countersigned by the Italian Consular officers in this country before leaving. — *N. Y. Times.*

Lumber Trade moving Southward. — Expert opinion is that ere long the South will become the centre of the lumber trade of the United States. Signs of the movement southward are already visible. Close observers of the situation are not surprised at the changed conditions. The pine-forests of Michigan and Wisconsin have been practically depleted, and dealers in this class of lumber have been forced to look elsewhere for supplies. Recently large tracts of Southern timber-land have been purchased by Northern operators, and they are now arranging to develop them upon an extensive scale. The Southern forests contain several varieties of lumber well known in Northern markets, besides many beautifully marked hard woods suitable for cabinet-work and inside finishing. There are vast areas of such land in the South, and the indications are that for many years this industry will be one of the most profitable in "Dixie." Since 1890 the lumber trade has made great strides in the South. The New York *Journal of Commerce and Commercial Bulletin* has compiled a table showing that during the ten years ended in 1900 the aggregate value of products of the lumber industry increased $128,885,602. Of this gain the thirteen Southern States furnished three-quarters. According to the same authority, the lumber business in Michigan and Wisconsin declined $32,000,000, or more than 38 per cent.; other Western States which are extensively engaged in the lumber trade also suffered heavy loss. In some of the Northern States the business continues to expand, but the percentage of gain is not as great there as it is in the South. Not only in lumber is the South forging ahead, but also in cotton manufacture, coal, iron and other lines. This section has supplanted the Eastern States as the largest producer of coarse cotton goods in the United States, and it is predicted by many that the day is not far distant when it will also become the leading manufacturer of the finer grades of cotton goods. — *Baltimore News.*

Copper-plated Doors. — It is reported that a process of covering wooden doors with sheet-metal by means of electrolysis is now being experimented with at Bridgeport, Conn. The excellent fire-resisting qualities of a wooden door covered with tinplate have long been recognized, since the metal covering prevents the wood taking fire, while the use of wood for the framing avoids any risk of the warping of the door by heat, allowing flames to pass through, as has happened with doors built wholly of iron A tinplate-covered door has, however, a poor appearance, and is therefore suitable only for workshops and warehouses. By depositing copper or bronze electrolytically, it is hoped to provide doors suitable for buildings of all kinds. The method followed is to place the carefully finished wooden door in a hot solution of fossil-gum in linseed-oil. This completely closes the pores of the wood with an impervious varnish, so that on transferring the door to the electrolytic bath the solutions are not absorbed. On removal from the varnishing-bath, the edges of the door are bound with sheet-copper fixed by cement, and the rest of the door is then covered with a conducting layer of bronze powder, after which the whole is placed in an electrolytical bath and copper deposited over the whole surface. — *Engineering.*

New York Sidewalk Vaults must be paid for. — Maurice W. Deshong, who some time ago sued the city to recover $914, which sum he alleged the city authorities compelled him to pay "under duress and actual compulsion," has received a set-back in the Appellate Division of the Supreme Court. In an opinion handed down by Justice Ingraham lately, in which Justices Van Brunt and Hatch concur, the action of the lower court in dismissing the case is sustained. Deshong is the owner of the premises at 54 and 56 West Third Street. Some time ago he decided to rebuild. When the building was originally put up there was a vault under the sidewalk. When rebuilding, Mr. Deshong attempted to reconstruct the vault, but the city interfered, and Mr. Deshong was ordered to get a permit from the city authorities. For the permit he had to pay $914, which he did under protest, and sued to recover the amount, claiming that inasmuch as the city had never made any charge for the original vault, they had no legal right to charge in the second instance. In his opinion, Justice Ingraham said: "It is too well settled to need citation of authorities that no person can obtain a right against the public to use a public street by prescription. There is nothing to show that the plaintiff or his predecessors in title ever acquired anything more than a mere license to maintain their vault, which was revokable by the public authorities. There is certainly no presumption that the public would be estopped from at any time resuming possession of the street or compelling the owner of the property to remove the vault." — *N. Y. Times.*

A modern Log-cabin. — On Warren's Island, off the coast of Maine, is being erected what is properly described as "a palatial log-cabin." It is composed of spruce-logs, and costs the tidy little sum of $75,000. The entire island on which this summer palace is erected was purchased by the late William H. Folwell, of Philadelphia. Mr. Folwell died before the completion of the house. The work is now superintended by his son, William H. Folwell, Jr. Some idea of the size of the "cabin" may be gained from consideration of the fact that there are 22 sleeping-rooms on the second floor. On the ground-floor there is a fireplace of brick and granite, the mantlepiece being of marble, 12 feet in length, 3 in width and 9 inches thick, the whole piece of work weighing some 40 tons. — *N. Y. Tribune.*

The Duke of Norfolk's Cathedral. — The death of the afflicted Earl of Arundel gives a pathetic added interest to the great cathedral which the Duke of Norfolk is building at Norwich. It was originally designed, in the Duke's own phrase, as "a thankoffering to God after my most happy marriage." But when the nave was completed and opened by Bishop Headley, another purpose was associated with it. "This noble church," said the Bishop, "was the offering of the piety of one whom we pray God to bless. When he planned and offered it, it was a thankoffering for happiness. But since then God has manifested His holy will in visitation and sorrow, and the founder hopes, in this offering, for God's blessing upon those who are near and dear to him." Building is now proceeding on the chancel and choir; and the finished cathedral will be associated with the memory of the Duke's dead son — *Westminster Gazette.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, AUGUST 23, 1902 No. 1391

CONTENTS

SUMMARY: —
The Philadelphia McKinley Monument Competition. — The Rights of the Abutting Owner in Shade Trees on the Highway. — Side-walls endangered by Water-soaked Flooring. — A Labor Union's direct Attack on an Architect. — The present Strike of the Anthracite-coal Miners. — Substitutes that can be used for Anthracite Coal. — The International Fire Exhibition, London. — The Dutuit Bequest to the City of Paris. — State Propagation of Trees. 57
LIBRARIES IN THE UNITED STATES. — V. 59
PROBABLE CAUSE OF THE VENETIAN ACCIDENT. 61
THE CRETAN PHÆSTOS. 62
LONDON DOCKS. 62
THE PORT OF LONDON. 63
ILLUSTRATIONS: —
Bird's-eye View: Sweetbrier Institute, Virginia. — Plan of the Same Group.
New Memorial Church, West Derby, Eng.
Additional: House, No. 485 Commonwealth Ave., Boston, Mass. — The Gymnasium from the Base Court: Sweetbrier Institute, Virginia. — Chapel and Dormitories: Sweetbrier Institute, Virginia. — A Bit of Terracing: Sweetbrier Institute, Virginia. — A Ramp: Sweetbrier Institute, Virginia. . . . 64
NOTES AND CLIPPINGS. 64

THE General Committee of the Philadelphia McKinley Memorial has issued its programme of competition for the monument to be erected to our lamented President in Fairmount Park. The Memorial, the cost of which is limited to thirty thousand dollars, is to include a portrait-statue of President McKinley, with a suitable architectural setting. Designs must be shown by models, at a scale of one and one-half inches to the foot, which must be delivered to the Secretary of the Committee, prepaid, before March 2, next. Five equal prizes are offered, of five hundred dollars each, and the author of one of the prize designs, if, in the opinion of the jury, any one is deserving of such distinction, will be recommended for employment to execute the work. The jury is an excellent one, consisting of Messrs. Wilson Eyre, Jr., Theophilus P. Chandler, Edward H. Coates, Charles E. Dana, J. Q. A. Ward, Paul Bartlett and Frank Miles Day. Competitors may be quite sure that no favoritism, carelessness or underhand dealing of any kind need be expected from such a jury. Further particulars of the competition, which is open to all artists, may be obtained from Mr. Charles J. Cohen, Secretary of the Committee on Design, 320 South Broad Street, Philadelphia, Pa.

A CASE of interest to architects and real-estate owners came up in the Appellate Court of Indiana a few days ago. The Western Union Telegraph Company, by its agents, injured certain trees in the public highway in front of the estate of Martin T. Krueger, who sued the Telegraph Company for damages. The question came before the Court whether the plaintiff would have a right of action for the destruction of trees in a public highway, even though he owned the fee in the portion of the highway in which the trees were situated. It is extremely common in this country for the fee in public streets and highways to be vested in abutting owners. This is the case, we believe, with many of the streets in New York, and any decisions which define the rights of the owners of the fee in such highways are of great importance. In the present instance, although no evidence had been submitted as to the character of Mr. Krueger's ownership, the Court said, as a general principle, that "An abutting owner, who owns the fee in land upon which a highway is located, is the owner of the soil, and of trees growing thereon, and of mines and quarries thereunder, so far as such ownership is not inconsistent with the public use. The municipality has the right to use these only in so far as they are necessary in the construction and maintenance of the way for the public use. Such an abutting proprietor, as to shade trees growing in front of his property, and upon land the fee of which he owns, has the rights and remedies of the owner of a freehold, subject only to the public easement." It will occur to architects of experience that this doctrine may be applied to other matters besides shade trees. In regard to vaults under sidewalks, for example, it would seem that, in highways of which the abuttors own the fee, this ownership would carry with it the right to construct and maintain vaults of any kind which did not interfere with free passage through the streets. It would, of course, be objected that the municipality might wish to construct subways in the streets, and that such vaults would interfere with them; but the implied contract between the property-owners and the municipality, at the time the streets in the business parts of New York and Boston were laid out, contemplated nothing of the nature of an underground railroad through the streets, and no considerations of public convenience can insert anything in a contract which was not contemplated by the parties when the contract was made.

A LARGE building of slow-burning construction was partly burned a few days ago in Pittsburgh. The floors, which were of heavy timbers, covered with three-inch pine plank, and this with one-inch maple flooring, resisted the flames very well, but the water thrown on the fire swelled the maple flooring so much as to push out the brick walls several inches. It seems that, in some of the floors, the maple flooring was simply lifted in ridges from the planking by the effect of the water; but, in certain stories, where a heavy load of boxes of glass prevented the boards from buckling upward, the whole movement was lateral. Architects will reason from this occurrence that maple upper floors in warehouses, if of large extent, ought not to be too dry before laying. In most cases kiln-drying is avoided under such circumstances, but it is important to keep the floors tight, and these boards, if not kiln-dried, seem to have been laid with very close joints. It may be observed that many architects who use the slow-burning construction pitch their floors slightly, and provide outlets, by which water thrown upon them to extinguish fire may escape without soaking the boards; and if, as is sometimes done, a little gutter is contrived in the flooring at the two sides of the building parallel with the floor-boards, the swelling of the latter will not affect the walls.

CERTAIN architects of the highest ability and distinction have, in the performance of what they conceived to be their duty to their employers, incurred the ill-will of an unimportant local union, affiliated with the International Building Trades Council, and the President of the offended union is now engaged in travelling about the country, endeavoring to secure from all unions connected with the Council a pledge to refuse to do any work on buildings designed by these architects. Under the system of mutual support in their attacks on other people which prevails among the unions, it is difficult to see how the organizations appealed to can refuse their coöperation in the contest, although, as the architects in question have a very extended connection throughout the country, the effect of refusing to work under them will simply be to throw a great deal of employment of the best kind into the hands of non-union men. In fact, it is not impossible that the bullying attitude which the building-trades unions have, of late, seen fit to assume toward architects in many localities may prove the most effective means ever devised for the humiliation of organized labor. A firm of architects like the one in question has, on an average, probably ten thousand men constantly working from its plans, and under its directions. It would be a simple matter, especially in these days of abundant capital, and easy organization, for these architects, or any others of equal capacity, to place themselves at the head of the designing department of a great construction company, employing only its own men, operating its own mills and workshops, and carrying on its operations without troubling itself about union rules or union men. A great deal of the best building work of the Middle Ages was done by coöperative associations of this kind, consisting of men accustomed to work together, under the guidance of architects whose designs they were skilled in interpreting; and, at the present day, the great building companies and firms employ very largely their own men, without concerning themselves about local unions. The latest of these building corporations has a capital of sixty-six million dollars. On such a capital, the corporation, presumably, expects to do a business of at least two hundred million dollars a year; or, to put it in the form favored by the political economists, to keep at least two hundred thousand men continuously employed, responsible only to it, and travelling from place to place as their services may be required. Against such an organization as this the unions

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

will be powerless. The corporations, with men trained to help each other, and to use the labor-saving machinery provided by the most skilful engineers, can compete at great advantage with contractors who have only the quarrelsome, unscrupulous and treacherous unions to depend upon for labor; and the day may not be far distant when in the building trades the only chance of employment will be found in the permanent force of building corporations. If anything could hasten this transformation of the great industry of building, it would be the attempt of the unions to discipline or injure architects, who, as the leaders of the building world, not only participate, from the first, in plans for the improvement of real-estate, but control, with almost absolute discretion, the manner in which such plans shall be carried out.

THE people who are, or who soon will be, toasting their food in front of wood fires, and shivering in unwarmed houses, may take from their troubles a lesson in regard to the methods of the union tyrants in this country. As every one knows, the dispute in the anthracite coal region is not over wages, but over the question of the "recognition of the union," that is, the submission of the coal-mine owners and the public to the dictation of irresponsible union magnates, who have their private ends to pursue, know perfectly well the pecuniary and political value of their influence, and are anxious to have frequent opportunities for exerting it. The example of the prosperous subsequent career of the most prominent figure in the great railway strike of ten years ago has, naturally, not been lost upon the professional agitators, and "labor troubles," intended to annoy and distress the public for the furtherance of their personal schemes, are likely to continue until the community is aroused to a better comprehension of the subject than it now possesses.

IN the present case, the owners of the coal-mines have been paying, and are ready to pay, wages far higher than the Hungarians and Lithuanian-Russians who form the majority of the miners could ever hope to earn in their own country, and many thousands of new men stand ready to take the place of the strikers as soon as they can be guaranteed security in doing so. Unfortunately, the Hungarian and Russian peasants, in addition to being grossly ignorant and degraded, possess the quality of being disposed to follow like sheep any one who gains authority over them. It is a saying among military men that Russian soldiers will march into the sea, or over a precipice, rather than question the propriety of an order given them, and this disposition has made the miners an easy prey to the agitators, whose more intelligent constituents have, of late, been getting rather unruly. In combination with their sheeplike docility, the Hungarians and Lithuanians have also a ferocious side to their character, which makes them the most dreaded and dangerous portion of the foreign community, and it is not surprising that the new men, who would gladly take employment in the mines, do not dare to face their hostility, which, as they know, is only feebly kept in check by the small show of military force on the part of the State authorities. While we have no sympathy for monopolies, which, by combination, seek to control, not only market prices, but the price of labor, it seems to us that, in this case, where the public must choose between a tyranny of bankers and railroad presidents on one side, and one of irresponsible and unscrupulous agitators on the other, it should, for the moment, favor the former, as being not only less dangerous to the community, but more amenable, later, to the control of law; and, whatever may be our private griefs against the "coal barons," it is better to avoid encouraging their opponents to further exertions, by talk of "forcing a compromise," than to run the risk of putting in the hands of the agitators weapons which will be used against us in the future, and of reducing to despair the anxious seekers for employment who are struggling with a monopoly more reckless and cruel than anything that we have to contend with.

AS to the question of the substitutes for anthracite which must, whatever may be the outcome of the strike, be very extensively used for the next six months, there is much that might be done to improve present circumstances. It is probable that the recent ordinances prohibiting the use of soft coal in cities, which are suspected of having been promoted, if not devised, by the anthracite trust, will be relaxed, the "coal barons" being now vitally interested in diminishing, rather than increasing, the demand for their product. Of coke, which has already come into extensive use for stoves and ranges, the supply is limited, and, even in the cities, it will form a very feeble resource. The best substitute for anthracite, for household use, would probably be the compressed blocks, made of the dust, either of hard or soft coal, mixed with tar and other substances, possibly silicate of soda, and pressed in moulds, which form almost the staple fuel in France and Germany, both for railway locomotives and domestic use. The blocks used in Parisian households are of the size and shape of half a billiard-ball, and have the great advantage over soft coal of retaining their shape while burning, instead of crumbling. For such blocks, properly made, there would be now an enormous demand, and it is singular that some one should not already have placed on the market in this country a manufacture which should, under present circumstances, bring fortune rapidly to the producer. Blocks of this kind are, or have been, manufactured in a small way in Massachusetts, but no attempt has been made to place them on the market, and nothing seems to be publicly known of the results of the experiment.

AN International Fire Exhibition is to be held in London next summer, under the auspices of the British Fire Prevention Committee. The affair is to be undertaken and carried on by a corporation, known as the London Exhibitions, Limited, which owns extensive buildings and gardens at Earl's Court, within the limits of London; but the technical direction will be confided to the Fire Prevention Committee. Besides a comprehensive collection of appliances for extinguishing fires, saving life in conflagrations, and caring for injured persons, the Exhibition will contain examples of fire-resisting construction in wood, metal and other materials, including fireproof doors, shutters, screens, wire-glass and so on, besides protective coverings and impregnated materials of various kinds; and including also equipment, in the shape of protective signals, theatre curtains, sprinklers, pipe casings and similar devices. The Exhibition opens in May, and continues until October. Exhibitors are charged for floor-space, at the rate of four shillings per superficial foot, with a minimum charge of forty pounds; but there are no further expenses, beyond the cost of transporting goods and fitting up stands and show-cases. It is intended to hold "tournaments" and competitions of fire-brigades and ambulance-drivers, and the Exhibition Company provides music, illuminations and other attractions.

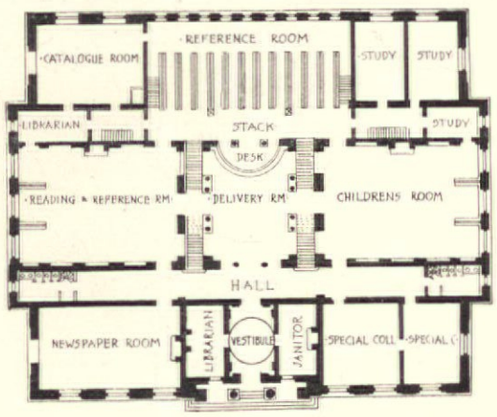
AN almost touching story of devotion to art is to be found in the account of the Dutuit bequest to the city of Paris. Many years ago, two brothers and a sister, the children of a rich contractor, were left orphans. One of the brothers wished to become an artist, and entered himself as a pupil of a distinguished painter. After several years of patient effort, he became convinced that nature had not endowed him with the talent necessary to make him eminent, and he modestly left the field to men more gifted, and devoted himself to collecting objects of art, with the avowed intention of presenting them to the community. More than this, he communicated his enthusiasm to his brother and sister, and they joined him, both with their money and their efforts, in his labor of love. Beginning with comparatively modest pecuniary resources, but with educated discrimination, and untiring zeal, the three orphans brought together, in the course of years, a collection valued at eight hundred thousand dollars, which has now come into possession of the municipality; and, with this, M. Dutuit has left a fund of six hundred thousand dollars, which will be employed in completing the Petit Palais des Beaux-Arts, in which the collection, consisting of ivories, carved furniture, porcelain, bronzes, pictures and other objects, will be deposited.

THE New York Fish, Game, and Forest Commission has under consideration a plan for propagating and raising young trees, to be given, when old enough to transplant, to towns and private citizens, to be set out on denuded lands. The professional nursery-men are, perhaps, not likely to view this scheme with favor, but, as neither towns nor private owners of barren lands are likely to have much money to spend on nursery stock, the intervention of the State, to furnish young trees for planting where none would otherwise be planted, cannot but be beneficial to the community. On a large scale, young pines and oaks, well rooted, and ready for development into vigorous trees, can be produced very cheaply, and the fact that they were available would induce many people to use them who would be discouraged by the expense, delay and disappointments incidental to raising seedlings for themselves.

LIBRARIES IN THE UNITED STATES.[1]—V.

PUBLIC LIBRARY, UTICA, N. Y.

IN the very recent competition for the Public Library, Utica, N. Y., ten well-known firms of architects experienced in the construction of library buildings were asked to compete. The conditions of competition and suggested outline plans of the two floors were drawn up by the assessor, Professor W. R. Ware, of Columbia University, New York. It has been found necessary to cut down the size of the selected design considerably, but the general arrangement



Public Library, Utica, N. Y. Mr. A. C. Jackson, Architect.

exists. The plan illustrated is the competition one without these variations. In the suggested outline-plan certain points are distinctly good, particularly the relative positions of the stack-room, delivery hall and space, and the reference and children's reading-rooms, but to obtain this nearly all these rooms have to be top-lighted to assist the side-lights — perhaps a doubtful feature, certainly an extravagant one. The children's room occupies an important place. In the conditions, its area was desired to be as the main reading and reference room. The suggested position and form of the stack-room, with its reference-space extending its whole length on each floor, is also good, the only objection being that the inside portion of the stack might be dark, depending, as it does, on the borrowed light of the lantern over the delivery-hall. Still, the advantage of having all the books within such easy reach is great.

The basement, which is about 8 feet 6 inches in the clear, is entered from the outside by an entrance from an area in the rear. The area is reached by a very wide flight of 14 steps, 18 feet wide. On either side of the vestibule are placed the public lavatories and check-rooms, and beyond are 2 flights of stairs to the delivery-hall on the main floor. All the other rooms belong to the administrative side of the building, and include a very large general work-room, machinery, heating and ventilating plant, old-newspaper files, receiving and binding stores, and janitor's quarters. There are two service-staircases and a staff-entrance. The stack does not start on this floor.

On the first floor, or main floor after passing through the vestibule, which has the librarian's public-room, 12′ 6″ x 22′, and the janitor's room of the same size, on either side, the hall corridor is reached; it is 10 feet wide, and extends from end to end, toilet-rooms being placed at the extreme ends — rooms which are hardly required at this point and necessitating waste space in the form of corridor to get to them. In the front of the building to the left is placed the newspaper-room, 26′ x 46′, and in a similar position on the right 2 special-collection rooms, one 25′ x 26′ and the other 19′ 6″ x 26′; both these are reached from the corridor. Directly opposite the vestibule is the delivery-room, 29′ x 36′, with the delivery-counter projecting into it from the stack-room. On the right is placed the children's room, 36′ x 51′, and on the left the reading and reference room of similar size; the stairs to the second floor and basement are arranged on either side between. These stairs interfere very little with the scheme desired of having these rooms practically under the control of the delivery-counter; on the other hand, whenever the lecture-room on the second floor is used, the current of people using them must become a very disturbing element to the readers. Both these main reading-rooms are lighted from the top, as well as by 3 windows at the ends. From the floor to the flat ceiling-light is 30 feet, the remaining portion of the room being 22 feet 6 inches in height. The space in each room adjacent to the windows is divided into 3 alcoves by bookcases 6 feet high. Similar cases are fitted into recessed bays on the other three sides of the room to the same height.

The librarian's private room, 10′ x 23′, is placed between the reading-room and catalogue-room, 26′ x 34′, which is placed in the far left-hand corner of the building at the end of the stack-room. In a similar position to the right are placed 2 study-rooms, both 26′ x 17′, and balancing the librarian's room is a small study-room opening out of the children's room.

[1] A paper by Sidney K. Greenslade [*A.*], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal* of the Society. Continued from No. 1389, page 44.

The stack-room is 65′ x 38′. The stacks are each 18 feet long and are arranged in one row. There are altogether 12 of them, containing space for 21,600 volumes on each floor, a total on the 5 floors of 108,000. The spaces in front of the stacks towards the delivery-room and at the back towards the windows are both 10 feet wide, the latter being used as a reference-room. As this is arranged so on each floor, a great number of readers can therefore be accommodated quite close to the books. This is very like the plan adopted for the seminar rooms at Columbia University, New York. Both lifts and stairs at each end of the stack are conveniently arranged. In the mezzanine floor, over a small portion at either end of the stack-room, are provided coat and lunch rooms for the staff, and study-rooms.

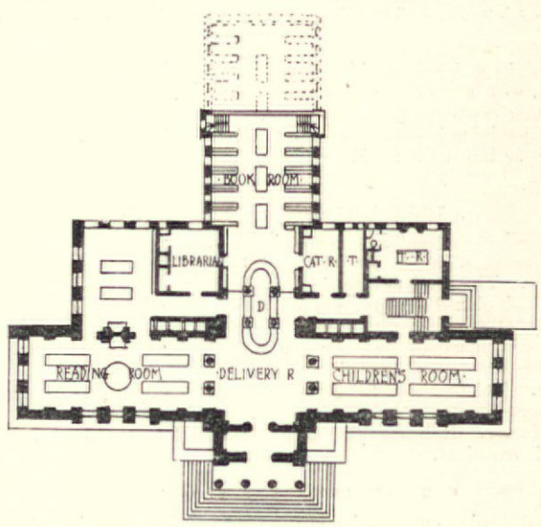
The second floor, which is level with the fourth floor of the stack, contains a large hall 30′ x 96′, a map-room 19′ x 26′, a lecture-room 19′ x 26′, two study-rooms 9′ x 36′ each, two special-collection rooms 19′ x 26′, a staff-room, with elevator, 14′ x 26′, trustees' room 19′ x 26′, and 2 toilet-rooms. The cost was limited to £30,000, and the architect is Mr. A. C. Jackson, of New York.

PAWTUCKET LIBRARY.

In the Library Building at Pawtucket, R. I., the planning is simple and straightforward. The approach is through a portico into a vestibule, and then directly into a square delivery-hall, with 2 large columns in each of the four openings leading to the main divisions of the library. Exactly opposite is the delivery-counter, enclosing a space, 25′ x 6′, having two semicircular ends, one towards the delivery-hall and the other towards the stack-room. From the attendant's desk practically all these main rooms are controlled — the children's room to the right, the reading-room to the left, and the stack-room in the rear. Originally the stack-room was arranged on the alcove system, but now it is fitted with stacks running in 4 rows lengthwise, with half-stacks at walls. They are 3 feet apart, and have 3-foot gangways across. The lighting will hardly be so successful as in the original scheme. Each floor of the stack is capable of shelving 21,000 volumes.

The general reading-room is 24′ x 55′. It is fitted with 2 rows of tables — 12 altogether — each 3′ x 5′, and seating 4. An open fireplace is placed on the inner wall, and on either side is an opening to the reference-room, 32′ x 23′, fitted with 4 round tables for 4 readers each. This room is also reached by a corridor from the delivery-hall. The children's room has also 2 rows of 12 tables, 3′ x 5′, 2 feet 2 inches high. Shelves are fitted between the pilasters along the wall of room, and the toilet-room is reached from the half-landing of the side staircase. Both these rooms are top-lighted, in addition to having windows at the front and sides. The ceiling over the delivery-hall is 36 feet from the floor, going up to a greater height than the adjoining rooms, which are 20 feet in height. The librarian's room, 20′ x 15′, and the cataloguing-room, 20′ x 12′, are placed adjacent to the delivery-desk, one on the right and the other on the left. A trustees' room and side-entrance hall and staircase balance the reference-room on the left. There is no second floor.

In the basement the newspaper and periodical room is placed under the stack-room, two circular staircases at the sides connecting



First Floor: Public Library, Pawtucket, R. I. Messrs. Cram, Goodhue & Ferguson, Architects.

them. The large rooms under the main reading-rooms are used, one as an art room and the other for special exhibits. They are fitted with special cases, swinging frames, etc.

The cost of the building was £45,000, and the architects were Messrs. Cram, Goodhue & Ferguson, of Boston.

FALL RIVER PUBLIC LIBRARY, MASS.

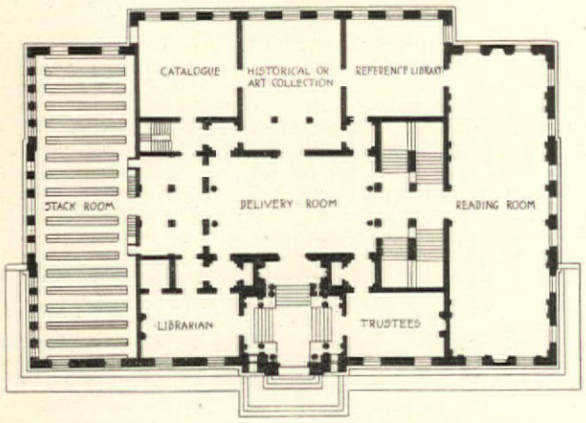
Although in one or two details the plan of the Public Library, Fall River, Mass., has been slightly altered, it is nearly the same as that illustrated, which was the one selected in the competition, but some of the rooms have been re-allotted.

The arrangement of plan is very simple. On the main floor is a large top-lighted delivery-hall, occupying the centre of the building. It has an arcaded gallery 8 feet wide on the second floor, surrounding it. To the right of it is the main staircase, very well arranged, and beyond is the periodical reading-room. To the left is placed the large stack-room, eventually to be fitted with 7 floors, and then capable of taking 325,000 volumes. Opposite the main entrance is the reference-room, occupying the position originally assigned the "Historical Collection," but one bay on either side wider. To the left of this room, adjoining the stack-room, is the librarian's room, and to the right, adjoining the periodical-room, is the card-catalogue room, with 2 stands for the card-catalogue, and 2 tables, 8′ x 4′, 31 inches high, with 4 seats either side.

There are three openings from the delivery-hall into the working space between it and the stack-room. The large central one is fitted with the delivery-counter, segmental in plan and projecting into the hall; and the two sides have straight counters (for registration and information), of similar height, 3 feet 7 inches. The stacks are 18 feet in length, in one row — 16 altogether, without the wall ones. They are 2 feet 6 inches apart. The staircase is placed centrally, and projects into the working-space, which is top-lighted. The delivery-floor level is the same as the third floor of the stack.

The periodical reading-room is well lighted on three sides. It goes up through the whole height of the building, and has a barrel ceiling, at present undecorated. The 6 tables are placed the short way of the room, and are 13 feet 9 inches long by 3 feet 6 inches wide, seating 6 either side. In the reference-room are 2 tables, 12′ x 3′ 11″ and 2 feet 7 inches high, each seating 10 readers. Oak bookcases are placed around the room, 6 feet high. The attendant's desk is at the stack-room end, next the librarian.

In the basement, under the far end of the periodical-room and the whole of the card-catalogue room, is the children's room. Beyond, under the reference-room, is a large reading-room, which eventually will be added to the children's department. The basement can be



Public Library, Fall River, Mass. Messrs. Cram, Wentworth & Goodhue, Architects.

reached by stairs from the delivery-hall, but there is also a side entrance, with a prettily vaulted vestibule on 4 gray-granite columns. Art-galleries occupy the second floor.

The public toilet-rooms are all placed in the basement.

The architects were Messrs. Cram, Wentworth & Goodhue, of Boston.

TOWN LIBRARIES. — DIVISION III.

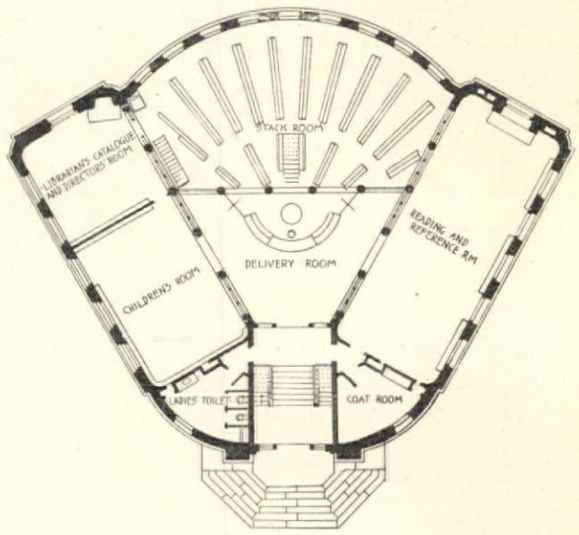
The effect of the "free access" policy, now so often adopted, is well illustrated in the plans of the 3 libraries selected under this heading. The tendency to do away with walls and substitute columns with glazed-screens between is a feature in all of them. In the East Orange and the Tacoma libraries the use of the radiating-stack, particularly in the latter, is new for such large buildings. The advantages obtained are enlarged upon in the descriptions of the libraries. The plan adopted for the Duluth Library is an unusual one, and there seem great possibilities of a development on similar lines in the future. It is not quite so well matured as the Tacoma plan, which is excellent.

CARNEGIE LIBRARY, EAST ORANGE.

The somewhat curious plan of the Carnegie Library, East Orange, N. J., is caused by the triangular shape of the site, and the result of such restriction of site has not been detrimental. In fact, it has allowed of the fitting-in of the rooms in a remarkably happy manner, and the relative positions of the two reading-rooms, the stack-room, and the delivery-room are very good. It is worthy of note that beyond the doors of the vestibule there are practically no internal walls on the first floor, but columns with glazed-screens which separate room from room. The advantage of this is very great from the control point-of-view. In the vestibule are placed the stairs to the basement, either side of a flight of 8 steps leading up to the main floor. In the basement under the whole of the stack-room is the auditorium; it is 12 feet high. The other rooms are 9 feet, and consist of store-room, repair room, janitor's room, men's toilet, boiler-room, and lunch-room for the staff.

On the first floor the delivery-room is a curiously-shaped four-sided space, right in the centre of the building. The short side, at the entrance, is 13 feet, the long one, opposite the next stack-room, is 40 feet, and the depth of the space between is 23 feet, with a varying width of from 13 feet to 40 feet.

The delivery-counter is placed in this space on the long side next



Carnegie Library, East Orange, N. J. Messrs. Jardine, Kent & Jardine, Architects.

the stack-room. The card-catalogue is arranged either side of the attendant on the counter, and beyond are turnstiles for the public to enter the stack-room. The whole of the stack-room is seen from the delivery-room. The height to the top of the columns surrounding the delivery-hall is 12 feet 6 inches, and to the flat circular skylight-lighting, some 20 feet. To the right the reading and reference room is placed; it is 20′ x 49′ 6″; and on the left is a similarly proportioned wing, in which the children's room, 20′ x 29′, and the librarian's and catalogue room, 20′ x 20′, are placed, the latter connected directly with the stack-room. The stack-room's extreme depth is 29 feet and width 58 feet, the outer wall being segmental. The stacks radiate from a centre at the attendant's desk. Against the outer wall is a gangway 3 feet wide; 5 feet separate each of the 11 stacks at this outer end, and they are about 14 feet long, and 2 feet 6 inches separate them at the inner end. There is also an inner row of small stacks, radiating from the same centre but of shorter lengths. There is room for two floors of stacks, and the height to the ceiling is 14 feet 8 inches. At present only one floor is fitted up. Each floor will contain about 23,000 volumes, a total of 46,000 in the two floors.

This is a decidedly interesting little library, and the general openness of the whole of the interior, making the control of every part from the attendant's desk easy, is a very important feature.

The cost was about £9,000, and the architects were Messrs. Jardine, Kent & Jardine, of New York.

DULUTH LIBRARY, MINN.

The Library at Duluth, Minn., is remarkably compact in its plan, and should well serve its purpose as an open-shelf library. It is in outline in the form of a Greek cross. The side-arms project very slightly. The extreme dimensions of the building are about 110 feet each way. It is practically of 2 floors, the ground floor, 11 feet in the clear, consisting of a newspaper-room (32′ 6″ x 39′) on the left of the entrance-hall, which is 19 feet 6 inches wide, and the juvenile-room (32′ 6″ x 39′) on the right. Provision is made for 2 future stack-rooms in addition to the main stack-room, which starts on this floor, one behind the children's and the other under the fiction-room. The lavatory accommodation is placed right in the centre of the building, apparently with only borrowed lights, men on one side, women on the other; this arrangement and position seem hardly successful. A packing-room below the work-room, with lift and stairs adjacent, and a store-room, boiler-room, engineer's room, etc., complete the accommodation provided on the lower floor.

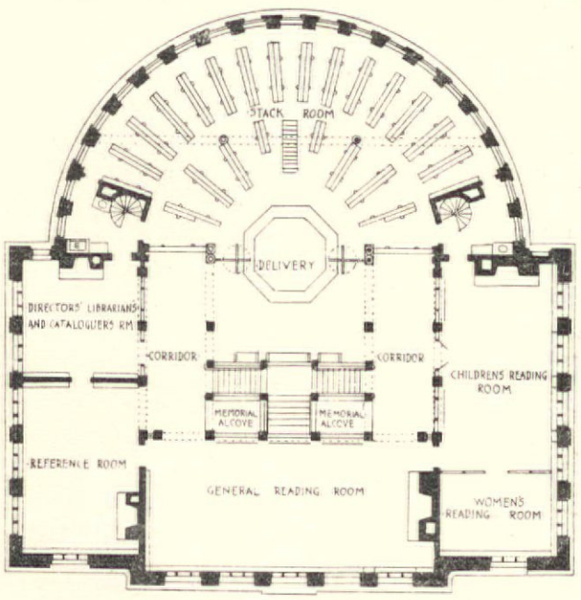
The first floor contains the principal rooms. These are all grouped around an octagonal space, 32 feet across, placed in the centre of the building. This public space is reached by the main staircase directly from the entrance vestibule, and on the side facing the entrance is the delivery-counter, with working-space behind, the whole width of the octagon, and 12 feet deep. This central octagonal delivery-hall is domed and top-lighted, and has four short sides, 8 feet wide, at the corners, and four main sides, 21 feet wide, having openings with columns between. The opening behind the delivery-space enters the stack-room, the opening on the right into the children's reading-room, and on the left into the fiction-room; both rooms are fitted with stacks. Between the children's room and the stack-room the librarian's room is placed, practically controlling the library. There is also a private room behind. At the back of the children's reading-room and opening out of it is their stack-room. The large reference-room and the general reading-room are placed to the front. A

ladies' reading-room, with lavatory accommodation, is placed just over the main entrance (which is the only entrance), and over it a board-room is placed, the only room on the second floor. At a height of 7 feet 9 inches, the glazed floor for the third tier of stacks is placed and forms a gallery finished with an iron railing just behind the columns forming the octagon. This floor occurs on the sides of the octagon opening into the fiction-room and stack-room only. The main stack-room is 32′ 6″ x 32′. The stacks are placed at 4-foot centres and two 12-foot lengths, with 2-foot 9-inch gangways, and contain 75,000 volumes. There are 3 tiers with glass floors. Tier No. 2 is at the same level as the first floor. In the fiction-room they are arranged similarly, as well as in the small room adjoining the children's reading-room. The children's room is 33′ 6″ x 26′ 6″, and is shown with 6 large tables, 11′ 6″ x 3′.

The general reading-room is 32′ 6″ x 39′, and well lighted on two sides; it is shown with 8 large tables, 3′ x 11′ 6″, and shelving around the room to window-sill height. The reference-room is 32′ 6″ x 39′, balancing the general reading-room. The general openness of this plan is very good from the control point-of-view; with the exception of the columns and small piers at the corners of the octagonal hall there is practically nothing to obstruct the view of the whole of the rooms from the delivery-desk. The architect was Mr. A. F. Rudolf.

TACOMA PUBLIC LIBRARY, WASH.

The Public Library, Tacoma, Wash., is one of the largest of the recent libraries where the radiating stack-scheme has been adopted,



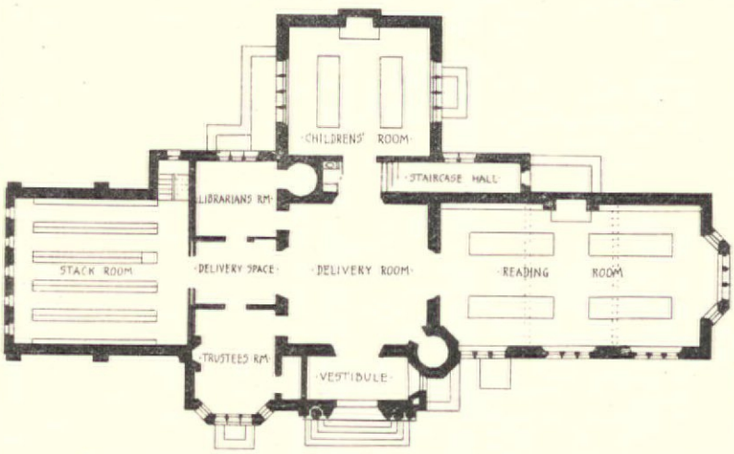
Second Story: Public Library, Tacoma, Wash. Messrs. Jardine, Kent & Jardine, Architects.

and where the maximum of supervision from the central delivery-desk is possible over every portion of the main floor of the library. The main building has a frontage of 95 feet 8 inches and depth at sides of 53 feet 8 inches; in addition, in the rear, is the semicircular stack-room. The whole consists of 2 floors.

On the first floor is placed, to the left, the newspaper-room, about 20′ x 50′; on the opposite side of the building are the boiler-room, engineer's room, and coal-room, and between them, in the front, is the large entrance vestibule, with men's and women's lavatories and a *foyer* on each side of the stairs to the main floor. The auditorium, which occupies the whole space under the stack-room, is approached from these *foyers*.

The main library floor is reached by a staircase placed centrally up from this entrance vestibule, 8 feet wide; the stairs branch (5 feet wide), half way up, right and left, reaching a wide open corridor on each side, forming wings to the central space in front of the delivery-desk. This central delivery-space is 25 feet wide, and is provided with seats.

The octagonal delivery-desk is practically in the centre of the building, having an internal diameter of 12 feet (over this space is a domed top-light), and on each side are turnstiles at the entrance to the stack-room.



Public Library, Nashua, N. H. Messrs. Cram, Goodhue & Ferguson, Architects.

The stack-room has a radius from the centre of the delivery-desk of 38 feet. There are 2 rows of stacks; in the outer row are 16 and in the inner row 8, both 10 feet long, with a 2-foot 6-inch gangway between. There are 2 tiers of them, both floors having a total capacity for shelving 44,000 books.

The general reading-room is placed to the front centrally, and is approached from the corridors on either side by large openings 7 feet 6 inches wide. It is 22 feet wide and 50 feet long, very well lighted, and having glazed openings overlooking the main stairs and delivery-space. The right wing is divided into the children's and the women's reading-rooms. The former is 20 feet wide by 34 feet 6 inches long, and the latter 14′ x 20′, a low railing 3 feet high, with gate, separating the two.

In the left wing are placed the reference-room, 20′ x 28′ 6″, and the directors', librarian's, and cataloguer's room behind it, 20′ x 19′ 6″.

The amount of floor-space lost by the radiating stack-scheme is somewhat great; at the outer gangway the distance between the stacks is 4 feet, narrowing to 2 feet 3 inches; at the inner one 4 feet 6 inches, narrowing to 2 feet 9 inches. On the other hand, the ample space next the windows would allow plenty of room for a seat and small desk to be used comfortably, and where free access is given to the stack-room a good space between the stacks becomes essential. A window between each row of stacks is provided, 3 feet 6 inches wide, so they are well lighted, the inner ones being also helped with the dome over the delivery-space and two additional skylights. The approaches to all the rooms are direct and well under control, and all the rooms are exceedingly well lighted. Ample book-shelving is provided along the walls under the windows in each room for reference. The absence of walls between the various rooms and the use of columns with glazed screens instead, and the radiating arrangement of stacks, make the control of the whole floor an easy matter from the delivery-desk. The architects were Messrs. Jardine, Kent & Jardine, of New York.

[To be continued.]

PROBABLE CAUSE OF THE VENETIAN ACCIDENT.

IN the *Edinburgh Scotsman* Mr. A. Robertson gives the most plausible explanation we have seen of the lamentable collapse of the tower of St. Mark. He gives the following summary of previous disasters, slight or grave: —

"It had been damaged by lightning, by fire, and by earthquake several times. On June 7, 1398, it was struck by lightning. In 1401, on the occasion of festivities for the Doge Michael Steno, fires were lighted on the platform and the top was burned. On October 24, 1403, the same thing happened. In 1405 the same thing happened. In 1417 it was struck by lightning and the new top of wood again burned. On June 21, 1436, all the shops around the Campanile built against it were burned. On March 26, 1511, an earthquake split its four corners. In June, 1548, it was struck by lightning. In 1565 it was struck by lightning. On July 10, 1591, an earthquake caused it to shake from top to bottom. In 1653 again struck by lightning. On August 23, 1657, again struck by lightning. On April 23, 1745, again struck by lightning, which damaged its east side severely, killing many people in the Campanile and near it. This was its last and most serious damage, although it was not till June 18, 1776, that the Republic employed the scientist Giuseppe Toaldo to put up a lightning-conductor."

Then as to the proximate cause of the irreparable disaster, he says:—

"And now comes the critical point. The Loggetta, a little marble hall, built by Sansovino, rests against the eastern wall of the Campanile. It had almost a flat roof. To prevent the rain beating against the Campanile and, running down its side, from entering this marble hall a row of slabs of stone sloping downward was inserted in the Campanile where the roof met it.

"Only last week, that is, but ten days ago, these stones were begun to be removed, as the rain was somehow getting into the Loggetta, and a lead sheeting was to have been substituted. Instead of carefully removing one stone at a time they removed half of them — that is, 25 feet of them. Not only so, but they dug through the new wall of the Campanile, that of 1745, and struck the old original wall, which they found separate from the new, and full of holes and cracks. Whilst working the old wall slipped down an inch or two. Instantly, the cut made was built up, but it was too late. On Wednesday, the 9th, it was observed that the new wall was cracked at the northeast corner, above the Loggetta, where the work was begun. On Thursday it was enlarged. On Friday it was struck across the north side

of the Campanile, sloping upward to the second window from the ground, then up to the third. On Saturday it passed behind the fourth and through the fifth. On Sunday the situation was, to use the word of an engineer, "desperate," and the Campanile was doomed. On Monday the crack visibly opened whilst we watched it, and the end came in a moment, when the whole structure sank into itself.

"Now for the responsibility. Who was responsible?

"First, the engineer of the Campanile is Signor Saccardo, who is the engineer of St. Mark's Church. But Signor Saccardo is not the engineer in charge of the "marble hall," the "Loggetta" of Sansovino. That is under the charge of the authorities who take care of other national monuments in Venice. Secondly, these authorities in repairing the Loggetta roof, for which they were responsible, cut into the Campanile, as we have seen, as one might cut into a tree they intended to fell, and this they did without consulting Signor Saccardo, who bears the care of the Campanile.

"The cutting they did, had the Campanile been in good condition, would have had no effect upon it, but as things were, it was the last straw that broke the camel's back.

"To-day the Minister of Public Works, Signor Nasi, accompanied by Signor Calderini and Signor Boito, has arrived from Rome, and an inquest will be held.

"Meantime, I have but two observations to make. First, knowing the perilous condition of the Campanile, was it right to allow travellers to ascend it as recently as Saturday night? Many, many climbed its gradient steep on Saturday, the last ever to do it. Was it right to allow thousands of Venetians and strangers to promenade under its shadows on Sunday? It was only on Sunday night the band was ordered to stop playing. On Monday morning, ten minutes before its fall, we ourselves were around and around examining and touching it. Secondly, there are too many masters in Italy. The idea of two monuments built against each other, like the Campanile and Loggetta, being under different authorities, who work independently of each other! In Venice, indeed, there are five different sources of authority in regard to such monuments — namely, the authorities of St. Mark's, the authorities for the care of monuments, the Belle Arti authorities, those who have charge of public works, and the Committee of Vigilance. Then, there is a seventh, the Artists, who often make their voices heard in favor of not disturbing the old, worn, time-eaten face of things, and who sometimes hinder external renovation.

"The Campanile weighed, it is calculated, 22,000 tons. That is the mass of débris, the pyramid of material, to be sorted and cleared before rebuilding can be begun. Subscriptions are being taken up for that purpose, and half a million francs has been already received, as promised ($100,000), but of this another time."

THE CRETAN PHÆSTOS.

LIKE other Cretan traditions, the claim of the island to have had a hundred cities is proving not altogether vain. Remains of primitive settlements, too considerable to have been villages, are coming to light at far more points of the Cretan coast than bear a name in classical atlases. There are half a dozen such in a part only of the eastern half isle, and the recent exploration of two among these supplies a key to the rest. One now suspects a "Mycenæan" site in every larger plain of the periphery. So far as searched at present, these towns show little or no sign of having continued into the historic period. Their civilization was blotted out with the "Mycenæan" domination. The succeeding class of remains is found for the most part higher up inland, on difficult heights or in remote gorges. The coastal plains were secure no longer. An age of seafaring and communication between ancient seats of luxurious life had given way to one of local and jejune development. But why and how we may only guess.

The crown of the great Cretan civilization was in Mindan Knossos. No other site in the island had furnished, or is likely to furnish, evidences of so high artistic achievement. But there is at least one notable site better preserved. Knossos, owing to its revival in later epochs and the proximity of its site to the mediæval capital of Crete, has suffered wreck and plunder beyond other sites. Much knowledge and more imagination are required to invest with full significance its "shorn and parcelled ruin," which, lying low in a featureless valley, conveys no immediate impression of magnificence. One must study its cracked and faded fragments of fresco, and look narrowly into the work of its reliefs and stone vases, to realize why it claims to rival Mycenæ in interest. The house must be reconstructed from its furniture, rather than the furniture from the house.

The ordinary visitor, not a specialist, will, therefore, prefer the ruin at Phæstos, on the south of the island, the full revelation of which has certainly been the sensation of the past spring. When Professor Halbherr announced in 1900 that he had begun upon a lesser Knossos no one expected that he and his Italian colleagues were to find, in the event, a palace more uniform, complete and imposing. What they have now laid bare stands alone in Crete as a spectacle. Even those fresh from the Mycenæ walls and the treasury of Atreus, or even from Egypt and Syria, must admire the broad staircases and majestic courts of Phæstos, all on so intelligible a plan and preserved to a point which excites without overtaxing imagination. The ruin covers a promontory of rock. Far below, the greatest of Cretan plains stretches to Mt. Dicte in the blue distance. Ida hangs right over the site and through a gap in the screen to the west show the snows of Sphakia, all three high masses of the Cretan relief being visible from this one point. In so superb a setting it is the more pity Phæstos should be so difficult of attainment. It may, indeed, be reached in an hour from the sea, but it is from the stormy, harborless Libyan Sea. A steamer that had landed its passengers in the sunrise calm at Dybaki would often be unable to reëmbark them at noon. One must ride, therefore, from Candia, making a three-day expedition, which will include also Gortyna; but the days are long and the paths are rough.

The palace of Phæstos is contained in a vast rectangle, obvious at first sight. There had been an earlier structure, but the building now revealed is of the character and period — that of the acme of the Mycenæan age in Crete. The visitor, approaching from the north, sees from a terrace the ruin below distinguished into three main quarters. On his left a broad stairway descends to a spacious paved court, containing an altar and tiers of stone seats, built up against the rock, evidently to hold an assembly. Flanking this on the east and raised high above it is the main building, entered by a truly majestic flight of steps, extending the full width of the fine pillared hall at their head. But the entrance from without is from the opposite side, where a second and larger paved court stretches to the brink of the precipiece. Thence is admittance not only to the pillared vestibule and the main hall, but to a doubled rank of galleries, and a maze of small chambers to southward, which form the third quarter. This great court, round which the walls and doors are admirably preserved, vies with the region on the west, where the two main stairways meet, as the best point-of-view on the site. To one standing in it, the uses of the various blocks about it are manifest. Here were the living and sleeping rooms of men, there of women. Their common hall of assembly occupies half another side; the store galleries for the produce of the plain fill the other half. In the chambers to the south they bathed, worshipped and lodged their retainers and their beasts.

All this is constructed of an excellent limestone, which has retained its sharp and square outlines, while the Knossian gypsums have crumbled and collapsed. The general impression, therefore, is the more convincing. But in details, the inferiority of Phæstos is unquestionable. The elaborate frescos, the sculptured friezes and the delicate plaster-relief of Knossos were never here. Phæstos was provincial. It could command good stone and good masons, but not the materials or the men for the more subtle crafts. The noble shell was decorated only in the rudest manner, and its ruin is not comparable to that of Knossos as a museum of art. On its plastered walls appear none but conventional patterns of a primitive sort; the only sculptured thing of any note yet found is a fragment of shell; the clay vases are interesting, but of common ware, and the fine stone vases have not come to light at all; trinkets in the precious metals or stones have not been found, and two small tablets make a poor show beside the immense clay library of Knossos. Indeed, all the smaller finds are conspicuously wanting. For example, clay impressions of lost signet-intaglios, a most valuable class of which Knossos has yielded to Mr. Evans scores of admirable examples, and Zakro some hundreds to me, remain unrepresented among the Italian discoveries. —*D. C. Hogarth, in the London Times.*

LONDON DOCKS.[1]

AT London the rise and fall of the tide is very great, the mean rise and fall being 17½ feet at London Bridge. At various points along the river piers are built out, at the ends of which the coastwise steamers lie to receive and discharge their cargoes. These piers are too narrow to permit of mooring the whole length of the vessel directly to the ends of the piers, so mooring-buoys are placed in the river above and below the piers, and to these buoys the mooring-lines are made fast. All along the river below the Victoria Embankment, and also on the Surrey side, the warehouses are built at the water's edge and steamers and barges are brought alongside and lie there on the bottom while their cargo is discharged into the warehouses by long-armed cranes which are attached to the faces of the buildings.

In some places the bed of the river is prepared and levelled above the level of low-water mark, so that the flat-bottom barges can lie there when the tide recedes without dropping too great a distance below the level of the wharf. At various points in the river are placed mooring-buoys, to which steamers are made fast, stem and stern, to prevent their swinging while their cargo is discharged over the side into lighters, which are then floated up and down the river to the various warehouses. These lighters, or scows, are also taken into the various docks and loaded from steamers or vessels lying there, and then are taken out again into the river to the warehouses, railroad-stations and canals.

Docks similar to those at Liverpool are built on both sides of the river at various places. Some of the oldest, as the London and St. Catherine's Docks, are just below the Tower and are very massive, having heavy stone and brick warehouses built right on the quay-line. Below these, on the same side of the river, are the East and West India Docks, which are located on the inside of a bend in the river and have openings into the river at both ends. Below these again are the Victoria and Albert Docks, and at the mouth of the river are the new Tilbury Docks, which are the only ones into which

[1] Extract from a paper by F. W. Hodgdon, read before the Boston Society of Civil Engineers and published in the *Journal of the Association of Engineering Societies.*

the largest steamers can enter, the tidal basin having a depth of 23½ feet at low-water spring-tides and 42½ feet at high-water spring-tides. The depth on the outer sill of the lock leading to the closed dock is 1½ feet less. The Victoria and Albert Docks accommodate the larger part of the Peninsular and Oriental steamship lines, as well as many others. There are large cold-storage warehouses for receiving and storing frozen meat, and there have just been installed at the Victoria Dock small grain-elevators for transferring grain from barges to cars.

Some of the dock-walls in the Victoria Dock are constructed of vertical cast-iron I-beams, with webs and flanges over 2 inches thick, the spaces between the I-beams being filled-in with brick arches. There are also a few pile-piers built of square timber.

The walls of the Albert Dock are constructed wholly of concrete except at the entrances, where they are faced with brick. Very little is now being done in the London docks in the way of improvement, and I was told by the engineer at the Victoria and Albert Docks that it was almost impossible to get the authority to make the really needed improvements.

At the West India Docks one of the large entrance-locks was being reconstructed, the arch of the invert being taken out and replaced with one having a greater radius in order to allow modern vessels with flat bottoms to enter, the depth of water at the sides being increased about 4 feet; at the same time the lock is being lengthened and an additional pair of gates placed at the inner end. In order to carry out this work a coffer-dam of timber was built on the apron outside the entrance-gates, and at the inner end, in the dock itself, a circular coffer-dam was being constructed of Southern-pine timber, each pile constructed of two sticks 12 inches square bolted together. The piles thus made, being driven close together in the dock, form a semicircular wall 2 feet thick around the inner end of the lock. These piles were driven as close together as possible in sections of ten piles each. When one section was driven a space of about 10 inches was left and then another section of ten piles was driven. This was continued until the whole distance had been covered. Then, by the aid of divers, the exact space between each two sections was measured and a pile, cut slightly larger than the space to be filled, was driven into it, thereby wedging all the others together.

To strengthen the top of the coffer-dam, a horizontal timber arch 8 to 10 feet thick and 12 inches wide, made of planks 3 inches by 12 inches, was built against its inner face. Between this and the bottom it was proposed to put in additional bracing by the aid of divers. Just before my visit, the dam had been completed with the exception of some of the under-water bracing, and an attempt was made to pump it out. When the water had been lowered about 12 feet, the dam gave way near the middle, and at the time of my visit it was being reconstructed with the intention of putting in additional under-water bracing. In placing the new invert in the lock, sections 5 to 6 feet wide are first cut out of the old invert and a new invert of concrete built in place; then the intermediate sections are cut out and sections are built-in between the sections previously constructed. The entrance at which this work is being done is 55 feet wide.

On the opposite side of the river is another large system of docks used largely by sailing-vessels.

There is a large passenger-traffic on the river in small paddle-wheel steamers which run up and down the river from Westminster Bridge and Greenwich every half-hour and other steamers which run much oftener to intermediate points.

Along the banks of the Thames are many dry-docks opening directly from the river. They are large enough to accommodate the ordinary sailing-vessel, and some are of considerable size. The sills are above the plane of low water, and after vessels are placed in them and the gates are closed, the docks are emptied by allowing the water to flow out as the tide falls, the sluice being closed at low water, and after the vessels have been cleaned or repaired the water is allowed to enter at high tide and the vessels are floated out. This makes very cheap dockage, no pumping-plant being required.

At Liverpool some of the older dry-docks, opening from the wet-docks, are equipped in a similar manner by having sluices built through the walls of the main dock out into the river; but all the larger and more recent docks are built with pumping-plants, the Canada Dock, the largest now in operation, being equipped with pumps which will empty the entire dock in 1½ hours. This method of operating dry-docks, of course, can be used only where there is a considerable range of tide, as there is in Great Britain.

THE PORT OF LONDON.

IN connection with the foregoing extracts the following, from a paper on the Port of London by the Right Honorable Earl Egerton of Tatton in the *Nineteenth Century* for July, will be found of interest: —

London is not the only port affected by the recent growth of the enlarged ports of Hamburg and Antwerp. The French are alarmed at the decadence of their ports, and an article appeared in the *Petit Marseillais*[1] commenting on a report from the Antwerp Chamber of Commerce, from which I glean some important facts. Since the abolition of the Scheldt dues threw open the Port of Antwerp it has been constantly progressing: from a port-tonnage of 3,063,825 tons in 1880 it had increased to 4,506,277 tons in 1890, to 5,322,262 tons in 1895, and to 6,872,848 tons in 1899; it is at this time the third port of Western Europe. This is a result of which the Belgians have reason to be proud. But the principal cause is that Antwerp has become more and more a, so to speak, supplementary port of the German Empire; the carrying of emigrants to America is very important, and it is especially from the American coast that the commercial and maritime increase comes. Napoleon wished to make Antwerp a pistol pointed at London, the heart of England; and does not the great Belgian port somewhat play this part to-day?

"But the progress of Hamburg is still more significant. In 1880 Hamburg was only the fifth port of Western Europe, and came after Marseilles, with a port-tonnage of 2,766,806 tons; in 1899 Hamburg had risen to the second rank, and closely presses London, with a port-tonnage of 7,765,950 tons.

This remarkable progress is due to three causes — the general development of Germany since the war of 1870–1871; the marvellous network of communications — railroads for light and costly goods, canals for heavy goods — which border upon Hamburg; and, lastly, the initiative spirit and the activity of the Hamburgers.

Another port whose progress is still more marked, and which although situated on Dutch territory may perhaps be considered as a sort of annex to the German ports, is that of Rotterdam; the seventh in 1890, it is to-day the fourth, and has considerably distanced Marseilles, going from 1,681,650 tons to 6,323,072.

The Port of Marseilles from the fourth rank in 1880 has fallen to the sixth rank in 1890, though the amount of its tonnage has always slowly increased: 2,769,047 in 1880 to 3,458,914 in 1890 and 4,699,168 in 1899.

The foreign trade of London and Liverpool is compared with that of other foreign ports in the following table. The figures of London and Liverpool are taken from the Board of Trade Returns for 1900 for vessels with cargoes and in ballast, and those for foreign ports from the *Petit Marseilles*: —

	1880.	1899.	Increase.	Position as a port.	
				1880.	1899.
London	5,970,341	9,437,950	3,467,609	1	1
Liverpool	4,913,324	6,152,187	1,238,863	2	5
Antwerp	3,063,825	6,872,848	3,809,023	3	3
Marseilles	2,769,047	4,699,168	1,930,121	4	6
Hamburg	2,766,806	7,765,950	4,999,144	5	2
Havre	1,969,000	2,175,000	206,000	6	8[1]
Rotterdam	1,681,650	6,323,072	4,641,422	7	4

[1] Now below Bremen.

One of the great drawbacks to the Port of London is the want of despatch in the unloading of cargo and the consequent loss to the shipowner.

Sir Alfred Jones states that while London costs about the same as Liverpool and Avonmouth, the despatch is about five times as bad in the case of a large vessel in London.

The usage of the Port of London is, that if required by the consignee the goods have to be delivered not merely on the quay but to the consignee's barge. There is great difficulty in doing this with the mixed cargoes that large steamers now convey, and it is cheaper for the shipowner to pay 1*s.* 6*d.* or 2*s.* per ton to get the sorting done on the delivery made on the quay than to suffer delay and loss consequent on the ship discharging overside to craft.

Sir Thomas Sutherland considers that shipowners ought to be able to discharge their ships in dock, on to the dock-quay entirely, as they do in all great ports, and that the subsequent handling of goods, if they are to be taken away by barges for the convenience of consignees, should be at the cost of these consignees; but in the present state of the dock-plant and of their warehouses, which are simply ground-floor sheds, it would be impossible to discharge *in toto* the large cargoes which are now brought into the docks.

It is difficult to realize how great is the capacity of these large ships. Mr. Douglas Owen points out that the cargo of a vessel, not by any means of the largest size — viz, of 8,000 tons — would require 1,000 truckloads or 50 trainloads to transport it; how can it be sorted, whether bags, cases, or packages, except there is a shed into which it can be lifted by hydraulic power, with five or seven stories to hold different classes of goods such as were recently erected in the Port of Manchester. It is in these provisions, which are supplied in the newest Port of Manchester, that London is deficient, and in which the modern ports of Antwerp or Hamburg have the advantage over London. In Manchester a line of railway and road for wagons run into the sheds so as to save as much as possible the cost of handling the goods. Alongside timber ships a floating platform is placed on which the timber is stacked and moved to any part of the port, and the vessel is discharged on both sides at once, on to the platform and quay.

[1] The 21st of April, 1901.

EARL GREY AND THE BRITISH LION. — Writing to the Honorable Secretary of the Rhodesia Memorial (1896) Fund, at Bulawayo, Earl Grey suggests some modifications in the design of the proposed monument. One alteration his Lordship desires to see is the removal of the assegai from the lion's breast, as he "does not approve of the British lion submitting to this indignity." It would, he maintains, be more in keeping with the history of the country if the lion stood upon a broken assegai, thus symbolizing the establishment of the Pax Brittanica in Rhodesia. — *St. James's Gazette.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

BIRD'S-EYE VIEW: SWEETBRIER INSTITUTE, VIRGINIA. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

A PORTION of this very interesting group of buildings, which is to shelter one of the largest schools for young ladies in the South, is now under contract.

PLAN OF THE SAME GROUP.

[The following named illustration may be found by reference to our advertising pages.]

NEW MEMORIAL CHURCH, WEST DERBY, ENG. MR. J. OLDRID SCOTT, ARCHITECT.

THIS plate is copied from *Building News*.

[Additional illustrations in the International Edition.]

HOUSE OF DR. A. COOLIDGE, NO. 485 COMMONWEALTH AVE., BOSTON, MASS. MR. R. CLIPSTON STURGIS, ARCHITECT, BOSTON, MASS.

THE GYMNASIUM FROM THE BASE COURT: SWEETBRIER INSTITUTE, VIRGINIA. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

CHAPEL AND DORMITORIES: SWEETBRIER INSTITUTE, VIRGINIA.

A BIT OF TERRACING: SWEETBRIER INSTITUTE, VIRGINIA.

A RAMP: SWEETBRIER INSTITUTE, VIRGINIA.

NOTES & CLIPPINGS

BUILDING-LABORERS SCARCE IN CHICAGO. — Chicago building-contractors are hampered in their business at present by a shortage in the supply of laborers, according to the Hod-Carriers' and Building Laborers' Union, which acts also in the capacity of an employment-bureau. The minimum wage paid for this class of work now is $2.80 a day, and contractors in need of men have run the price above the union scale. Union hod-carriers in many cases are getting 37½ cents an hour, while the union scale is but 35 cents. — *N. Y. Times.*

RESTORATION OF CLIFFORD'S TOWER. — The grant of £3,500 which the Treasury has just promised towards the cost of restoring the historic Clifford's Tower of York Castle is but a reasonable recognition of the national character of the work. Standing high upon the great Castle Mound, Clifford's Tower looks the part of beetling donjon to a nicety. The tradition attaches to it of having been the scene of the massacre of 1190, when some hundreds of Jews and their families shut themselves up either within its walls, or in other portions of the castle, in the vain hope of escaping the fury of the citizens. At present it is little more than a shell. For some reason or other the garrison which the son of the vanquished of Marston Moor maintained in the massive old keep was unpopular with the citizens, and one fine day the magazine blew up, and Clifford's Tower was an empty shell. — *London Standard.*

ELECTROLYSIS AND PIPE-SYSTEMS. — The question of electrolysis in pipe-systems and the proposed prevention of the action by means of insulating-joints, recently printed in the *Evening Post*, has brought forth a number of objections from those interested in the piping-systems. In response to these, George T. Hanchett has written to the *Electrical Review* to refute the arguments used. He declares that there are plainly two ways of stopping the electrolysis, one being to prevent the electric current from leaving the pipe which it has sought as the path of least resistance on its return to the power-house, and the other to keep it out of the pipe altogether. The proposed plan, he says, to make the pipe-return a poor conductor, is not to make the metal immune to electrolysis, but to keep the current out of it. The first plan, to prevent the current from leaving the pipes, which would also prevent electrolysis, could be carried out by making the pipe-line an absolutely continuous metallic structure, and connecting it solidly to the return feeders at all points where current tends to leave it. This, the writer claims, is rarely satisfactory, as the current distribution is continually changing with the position of the cars. The other plan, that of breaking up the piping-system so thoroughly that currents would not enter it, is believed by Mr. Hanchett to be a complete protection, and of much more worth than the first proposition. He says in conclusion: "Let us for a moment revert to the facts in the case. Electrolytic action is a simple and quiet chemical decomposition, taking place very much like the dissolving of metal in an acid, and without pyrotechnics of any kind. It is proportionate to the volume of current and to the time that it flows. It will attack any conductor, either poor or good, at the point of leaving if the conditions are such as to invite electrolytic action. It can be effectively checked by making *nil* the volume of current flowing. This can be done by thoroughly breaking up the electrical continuity of the piping-system. A partial attempt to do this will be worse than to leave the metallic continuity intact, and the experience and judgment of most of the newspaper communicants seem to be drawn from such cases, which are frequent in practice. If the conductivity of wet grounds were nearly that of cast-iron, it is probable there would be little choice between the iron pipe and the ground, which would make the construction of insulating-joints difficult. Unfortunately, the most conducting loam saturated with salt water measures about 20 ohms to the cubic yard, while a cubic yard of cast-iron, especially alloyed for high resistance, has a resistance of about .0000011, making the conductivity of cast-iron almost twenty million times as great as that of moist conducting earth."

A USE FOR THE PEAT-BOGS OF NEW YORK. — As the anthracite-coal miners' strike continues and the price of coal advances the people begin to look about for a substitute fuel. Dr. Wilson S. Pettit, of Lockport, who has investigated the fuel question to a considerable extent, says that $10, or even $8, per ton of anthracite coal this winter will mean that many people will not be able to buy a sufficient amount to keep warm and for domestic purposes. Unless a cheaper substitute fuel can be found, he thinks there will be great suffering, provided the strike is not settled very soon. Dr. Pettit has suggested that peat be substituted, to a certain extent at least, for anthracite or bituminous coal. It is not generally known that peat abounds in Western New York. On the bog-lands of Orleans, Erie, Monroe, Niagara, and Genesee counties there are immense deposits of peat as rich as any found in Ireland, Scotland, or Germany. The fuel is quite good, but because of the manner of combustion is not equal to either kinds of the most commonly used coal. It is suggested, however, that peat, treated with petroleum by an inexpensive process, would furnish a fuel equal in heat-producing powers to anthracite, and in many respects superior to hard coal. — *N. Y. Times.*

TO INCREASE INCANDESCENT-LAMP EFFICIENCY. — An ingenious system of increasing the general efficiency of incandescent lighting was recently described before the French Academy of Sciences by G. Weissman and André Blondel. The authors state the well-known fact that incandescent-lamps with carbon filaments cannot be made below 5-candle-power for pressures of about 100 volts, since the filament required is smaller than can be commercially manufactured and handled. They point out that the efficiency of a carbon filament also depends to a large degree upon the size and candle-power of the lamp. For example, speaking of commercial efficiencies and 110-volt lamps, the 32-candle-power lamp will show 3 watts, the 50-candle-power lamp 2.5 watts, and the 100-candle-power lamp 2 to 1.8 watts efficiency. It appears, therefore, that large filaments show higher efficiency in luminous output than the smaller ones, and also possess greater steadiness in burning on account of what may be called their heat inertia. The economizer system suggested consists in putting a very small transformer in the circuit of each group of lamps, so arranged that its primary is cut in or out by the lighting-switch. For example, in place of using 10-candle-power 110 volt lamps with fine filaments which consume 4 watts per candle-power, lamps of 22 volts and 10-candle-power may be installed, consuming only 2.5 watts per candle-power. At 22 volts lamps of 1-candle-power may be made very satisfactorily. The small transformer may be made of very high efficiency, going up to 97 per cent for sizes up to 300 watts. They are always worked naturally at full load, and as their primaries are cut out when the lamps are extinguished, cannot produce phase displacement or all-day core losses. It is stated that several thousand lamps have already been installed in Paris on this system, and during the 8 months they have been in operation have given generally excellent results. — *N. Y. Evening Post.*

WARNINGS FOR USERS OF ELECTRICITY. — In the Report of the National Board of Fire Underwriters are recounted these two very instructive stories: The destruction of one house nearly resulted from the overheating of an electric flatiron. The appliance was hung upon the wall when not in use. While in that position a child turned the switch so that the current was turned into the iron. After a time the heat became so intense that it communicated through the plastering to the lath and studding, which were finally ignited. The smoke was discovered by a servant on the third floor in time to avert serious loss. A $35,000 loss occurred during a thunder-storm when lightning temporarily disabled service-wires furnishing current to a supply-store. One of the employés going to the second floor to show some merchandise, turned the key of a lamp attached to an extension cord. As it did not work he carelessly dropped the lamp on top of some clothing. When the current was turned on a fire was started in the stock with very disastrous results. — *Exchange.*

THE TOWER OF ST. MARK AND PROFANE PRIESTS. — Some centuries ago, but discontinued in 1518, there was a curious iron cage, quite exposed to the elements, hung to the side of the tower about half-way up, into which swearing priests were locked for longer or shorter periods, their food being let down by ropes. The bells were 5, now buried in the débris at the bottom, and each had its own name, their music being as familiar to the Venetians as Bow Bells to London. Their ceasing to ring makes the silence of this silent city all the more marked. — *Pall-Mall Gazette.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, AUGUST 30, 1902 No. 1392

CONTENTS

SUMMARY: —
Further Contributions to "*The Georgian Period*" desirable. — Death of Gen. Charles G. Loring, late Director of the Boston Museum of Fine-Arts. — The Noisy Operating of the Boston Elevated Railway declared a Cause for Damages. — Raising Funds for the Rebuilding of the Tower of St. Mark. — The New York Municipal Art Society and the Street Signs. — General Plan for the Improvement of New York. — The Curriculum of the Department of Architecture at Harvard. — Architectural Fees for Public Work in Paris. — The Liverpool Cathedral Competition. — Gas-fixtures and a New York Sneak-thief. 65
LIBRARIES IN THE UNITED STATES. — VI. 67
THE ROYAL PALACES OF LONDON. 69
PROFESSIONAL OBLIGATIONS. 70
THE NEW ITALIAN LAW ON DEALINGS IN ART. 71
ILLUSTRATIONS: —
Commencement Hall: Sweetbrier Institute, Amherst Co., Va. — The Great Court, from the Residential Quad: Sweetbrier Institute. — Science Hall and Industrial Building: Sweetbrier Institute.
New Scotland Yard Police Station, Parliament St., Westminster, Eng.
Additional: House on Bay State Road, Boston, Mass. — The Library, from the Upper Terrace: Sweetbrier Institute, Amherst Co., Va. — On the Upper Terrace: Sweetbrier Institute. 71
NOTES AND CLIPPINGS. 72

THE eleventh Part of "*The Georgian Period*" is in press, and we now have only to select the material for the twelfth, and final, Part of a publication that has received from critics and reviewers an unusual amount of praise and remarkably little in the way of blame. When an undertaking of this kind is nearly complete, it is easy not only to know what matter has been gathered and used, but, conversely, what matter has not been used, presumably because it was unknown to the editor or for some reason inaccessible to him. It will be a misfortune if desirable and accessible material should not find a place in a work which to some degree is comprehensive and thorough, and hence we will make one more appeal to our readers to let us have the use of any illustrative material or historic and architectural data which, because of their real value, should not be omitted from the twelfth, and final, Part, already in an advanced state of preparation, but having still enough elasticity to take in more material than is at present in sight. At one time or another many people have notified us that they already had photographs or drawings of interesting and unpublished buildings, or else that they could easily procure them, and though frequent reminders have failed to make some of these promised treasures materialize, the proffers are surely a proof that there is abundant material to be had, if only memory, convenience and good-will could be brought to work synchronously.

AMERICAN art, as well as the American public, has suffered a great loss in the death of General Charles Greely Loring, for many years Director of the Boston Museum of Fine Arts. General Loring was a noble example of that class of citizens, peculiar, perhaps, to republics, who can serve their country in various capacities, and serve it well in all. Born of a distinguished and intellectual family, he interested himself, even in his college days, in the study of antiquity, and pursued his researches in a modest way after his graduation. At the breaking out of the Civil War he abandoned his peaceful occupations, and entered the army as Assistant Inspector-General of the Ninth Army Corps. He was sent immediately to the front, and participated in the great battles of the Wilderness, Spottsylvania and Bethesda Church, receiving his brevet as colonel for gallant and meritorious services. A few months later he was brevetted brigadier-general for services in the campaign in Eastern Tennessee; and, in 1865, he was made major-general by brevet. After the conclusion of the war, he made a short trip to Europe, and soon after his return, found congenial occupation in assisting in the arrangement of the Way Collection of Egyptian antiquities, which had just come into the possession of the Museum of Fine Arts. The skill and learning which he displayed in this work excited the grateful admiration of the authorities of the Museum, and he was elected a member of the Board of Trustees. Four years later he succeeded the late Martin Brimmer as Director of the Museum, and held this office until last May, when his feeble health compelled him to retire from his post. As Curator and Director, the administration, not only of the collections of the Museum, but of its finances, devolved upon him, and the burden of making a small and uncertain income cover the cost of making the Museum the public benefit which its founders designed it to be was often a serious one. Without his energy and resource, and the tact with which he conciliated all classes of citizens to the support of the Museum of which Boston has so much reason to be proud, some of the years of his administration would have been gloomy ones. It is said that his anxieties on this account were in a great degree responsible for the failing health which compelled him to give up his task at an age when a man of so much force might count upon several years of usefulness; and it is significant of the determination with which he carried out his duties as long as he could that hardly three months elapsed between his resignation and his death.

WE mentioned, some weeks ago, that suit had been brought against the Boston Elevated Railway Company, to recover damages for injury done to an estate abutting upon a street in which the railway is built, by the noise incident to the movement of the trains. This claim has been energetically contested by the railway company, on various grounds, but principally on the ground that the charter of the company provided that it should pay damages to abutting owners for obstruction of the street, and for deprivation of light and air, thus, by implication, excluding claims for injury from noise. This important case has now been decided in the Superior Court, the Chief Justice delivering an admirable opinion, in which he points out that, even if the Legislature were disposed to do so, it could not authorize a corporation to injure any citizen, or deprive him of any of his rights, without compensation; and that the question was whether the noise incident to the operation of the railway caused injury of a kind which, like the deprivation of light and air, entitled the sufferer to recover definite damages. In regard to this, the Court was of opinion that the estate of the petitioner had suffered injury, beyond any benefit that the location of the railway conferred upon it, to the extent of two thousand dollars; and that half of this injury was chargeable to the noise made by the trains. Naturally, the railway company, which is hardly likely to view with complacency the prospect of having the damages doubled in the compensation cases now pending, has asked permission to appeal to the Supreme Court; but it is said that the decisions of Chief Justice Mason are seldom reversed in the upper court. There is no doubt that the Boston Elevated Railway is very noisy. The structure is open, to allow as much light as possible to go through it; and this circumstance adds materially to the noise incidental to the passage of trains. Either for this reason, or for some other, the actual injury done to abutting estates, as shown by the loss in rental value, and the diminished prices obtainable in case of sale, has been very great along the line of the Boston Elevated road; and it may be found necessary, in order to save heavy damages, to devise some means of operating the trains more quietly.

THE National Arts Club of New York issues an appeal for American subscriptions in aid of the rebuilding of the Campanile in Venice, basing its appeal on the fact that for many generations Americans have received pleasure and benefit from the art and architecture of Venice, and that both public and private collections of works of art in Italy have long been freely opened to American students. Although Italy is poor, and Venice is poorer still, it is now said that the Venetian Government is disposed to attempt the rebuilding of the Campanile from its own resources, without calling for assistance from outside of Italy. Every one will commend the courage displayed in this resolution, which recalls the Venetian spirit of former days; but Americans might make a gift to the Venetians, to be used indirectly in aid of the rebuilding, which could

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

be accepted with perfect propriety, and would do much to endear the American name to the reserved and home-loving people of Venice. Every one may not know that, in 1777 or 1778, the new-born Republic of the United States of America, through Dr. Benjamin Franklin and its other delegates in Europe, proposed to the Republic of Venice a treaty of alliance and mutual support. The Venetian Government had just then too many cares on its shoulders to be disposed to assume any additional responsibilities in connection with a revolutionary Government four thousand miles away; but the feeling in Venice seems to have been favorable to the idea of intimacy with the young Transatlantic nation. Since that time, while Venice has seen its political and commercial importance almost disappear, the country which, a hundred and twenty years ago, was the only other commercial republic in existence, has risen to be the greatest power in the world; and so good an opportunity for the Americans, without offending the pride of a people whose commonwealth was a thousand years old before Columbus sailed from Palos, to show courtesy and generosity to the citizens of a community which favored them when they needed friends, may never occur again. Those of our readers who are disposed to join in the gift may send checks or money orders, payable to the order of Spencer Trask, Treasurer, either to the National Arts Club, New York, or to Spencer Trask & Co., 27 Pine Street, New York, giving at the same time their own name and address.

THE New York Municipal Art Society is finding its hands tolerably full in its endeavors to fulfil its duties under the new city charter. Recently, a design for a proposed street-sign was submitted to it, and approved. Nothing more was done for a time until an advertisement appeared, calling for bids for street-signs for the Borough of Manhattan, in accordance with a certain design. These bids were received and opened, but, before the contract was awarded, the Municipal Art Society learned that the design upon which the bids were invited was not that which it had approved. As the city charter absolutely requires the approval of the Society in such cases, the attention of the President of the Borough, Mr. Cantor, was called, in a letter which can hardly be too highly commended for its courtesy as well as firmness, to the fact that a contract awarded without such approval would be void. As the approval of the Comptroller is also required for municipal contracts of all kinds, and that official is now in Europe, nothing will be done about the matter before his return; but it is probable that, in view of the circumstances, he also will withhold his approval, so as to avoid involving the Society, which has done so much for the city, in any controversy, and that new designs will be made.

MEANWHILE, Mr. Cantor, who has the interests of his borough very much at heart, earnestly urges the appointment of a Commission to prepare a general plan for the improvement of New York, as has been done for Washington, and says that, if Mayor Low does not appoint such a Commission for the whole city, he will himself appoint one for Manhattan. Such a Commission would have plenty to do. Mr. Cantor mentions the "island" which has just been placed at Twenty-third Street and Broadway, giving due credit to the Municipal Art Society for its generous and enlightened aid in decorating it; and says that a similar island has already been provided for in Fourteenth Street, near Union Square; but, for the future, he thinks that such works should be placed in charge of a Commission of the sort that he proposes, which should study the conditions, and decide where future islands should be placed, and how they should be decorated. With these modest works to attend to, besides the greater schemes of viaducts, bridges, terraces and so on, which are already in contemplation, a good Commission, such as Mayor Low or Mr. Cantor would appoint, might almost revolutionize the appearance of New York in a few years, and it is to be hoped that the project will be carried out.

THE Department of Architecture of Harvard University has just issued its annual announcement, which has a special interest, partly on account of the courses in what may be called pure æsthetics, which accompany the more strictly utilitarian studies, and are, so far as we know, peculiar to the Harvard School of Architecture. It is, perhaps, unnecessary to say that the Harvard curriculum is thoroughly artistic, the student, as the announcement observes, being required "to devote all the time he can possibly give" to the work of the classes in design, besides drawing and coloring from the round and the life, and modelling in clay, for recreation; but, in addition to these things, a course is given in the Theory of Design, by Dr. Denman W. Ross, with an assistant, which appears to resemble in scope Garbett's little book, familiar to older architects, and to afford valuable and interesting suggestions to students of sufficient intellectual capacity to appreciate it. Dr. Ross, so far as can be gathered from the synopsis in the Announcement, begins by taking a spot of paint as a term of expression, and showing how its suggestions are varied through abstract form, symmetry, color, tone and harmony, comparing the appeal of pure design to the eye with that of music to the ear. This form of art is contrasted with that which suggests by imitation, or representation, and the influence of one on the other; and the "undeveloped possibilities of pure design" are treated in what must be an admirable course, which we wish might be available to architects of maturer years. A course in some ways related to this is given by Professor Santayana, a man, we need hardly say, distinguished throughout the civilized world for his brilliant essays on æsthetic philosophy, on the Philosophy of Art, with a survey of the æsthetic theories of Plato and Aristotle, Lessing, Schopenhauer and Hegel. This course is devoted more particularly to tracing the relation of æsthetic to scientific and moral matters, rather than to the development of the sense of beauty and the power of imagination which forms the object of Dr. Ross's course; but it should be not the less a very stimulating and strengthening exercise for students of high capacity.

THE city of Paris, after long discussion, has adopted an official scale of fees to architects for public work, which has an interest for the profession everywhere. As the municipality is likely to expend many millions of dollars in public buildings within the next few years, it has adopted a reduced fee for the most important commissions, making up for it by allotting a compensation larger than the traditional five per cent for the less important ones. As it now stands, the official scale allots to the architects of buildings costing more than one hundred and sixty thousand dollars a commission of only four per cent on the expenditure; for those costing from one hundred and twenty to one hundred and sixty thousand four and one-half per cent is paid; five per cent for those from eighty to one hundred and twenty thousand; five and one-half per cent for those from forty to eighty thousand, and six per cent for all buildings of less cost than forty thousand dollars. The Administration reserves, however, the right to increase or diminish the fee, according to the character of the structures concerned.

THE preliminary competition for the Liverpool Cathedral occupies much of the attention of writers in the English professional journals. Strictly, the competition was simply a general invitation to architects to submit such drawings, or other evidences of their skill in church design, as might enable the Cathedral Trustees to make a selection for invitation to the final competition. It may be imagined that many architects of the highest reputation would not care to enter such a contest, particularly as the Trustees did not bind themselves to make their selection only from the participants in the first competition; but a large number of well-known names were included in the list, among them being those of R. W. Gibson and Cram, Goodhue & Ferguson, who, we may be sure, have done credit to the skill of American architects in church design. The original invitation appeared, at the time, to call only for work done previously by the competitors, but many of the Englishmen understood it differently, and sent in actual designs for the proposed building. According to the English journals, most of these were not extremely successful, and it is likely that the building will be carried out by some one whose name has not yet been connected with it.

THE meanest thief recorded in history seems to have been discovered in New York, in the shape of a young man who goes through the halls of tenement-houses, breaking off the gas-fixtures, and carrying them off to sell for old brass, of course leaving the gas escaping in streams from the broken pipes. Fortunately, this youth has been captured, and it is to be hoped that his punishment may be such as to deter any one from imitating his exploits.

LIBRARIES IN THE UNITED STATES.[1]—VI.

BRANCH LIBRARIES.

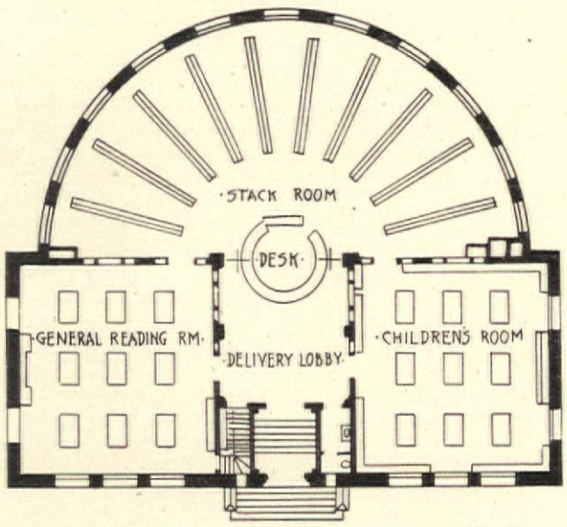
THE system of branch libraries and stations is remarkably organized in many of the large towns. At present few towns have started with a series of new buildings. Old buildings generally have been converted. such as schools, churches, private residences and shops. The branch library is therefore likely to develop very greatly in the near future. Those at Pittsburgh, Pa., which are in connection with the Carnegie Public Library there, are excellent, but they are only designed for isolated sites, and therefore represent only one type. It will be most interesting to watch the result of the work of the advisory board of architects appointed to design the 65 new branch libraries of New York. Quite a different type of plan will have to be adopted from those of Pittsburgh. The sites will be in ordinary street-blocks, between houses generally, with light from front and back only.

Some branches have already been erected in New York. The Bloomingdale branch, on a site with a frontage of 43 feet to the street and a depth of 60 feet, is a recent one, and will be described hereafter. Generally, for these branch libraries there is no need to provide more shelving accommodation than for from 15,000 to 25,000 volumes. Important books are easily obtained from the central library, and an automobile service delivers in a very short time what is asked for by telephone.

BRANCH LIBRARIES, PITTSBURGH, PA.

Up to the present time the planning of the branch library has been studied perhaps in Pittsburgh, in connection with the Carnegie Library there, more successfully than in any other town in America. There are 5 branches already erected of the 7 given by Mr. Carnegie, each on an isolated site, so differing in this respect from the branch library one would expect in a large town, where often the site is cooped between houses, with capabilities of lighting only from the front and back.

The first built was the Lawrenceville Branch, opened May 10, 1898. Its cost was about £8 000. In the preparation of the plans



First Floor: Lawrenceville Branch, Carnegie Library of Pittsburgh, Pa. Messrs. Alden & Harlow, Architects.

for this building the problem was to provide for a stack-room with a capacity of 20,000 volumes, a delivery-desk, a general reading-room and a children's room on one floor, and that every part of this floor should be visible from the delivery-desk, allowing complete supervision of the whole, so that free access to the shelves could be given to the public.

The plan will show how these requirements have been met. The general reading-room and the children's room, each 31′ x 33′ and 18 feet high, are placed on either side of the delivery-lobby, 21′ x 22′, which occupies the centre of the building. The circular delivery-desk is 14 feet clear diameter, and separates the delivery-lobby from the stack-room. The card-catalogue case is in the rear of it and faces the stack-room. The outer wall of the stack-room is semicircular, and its centre corresponds with the centre of the delivery-desk. Its radius is 37 feet 9 inches, and the 10 book-stacks, 18 feet long, radiate from the centre. From the delivery-desk, therefore, the assistants in charge command a view of its entire floor.

The 10 stacks in the stack-room have a capacity of about 25,000 volumes, which may be doubled by superimposing a second floor, sufficient light having been provided.

This branch being worked on the free-access plan, the doors C and D on either side of the delivery-lobby are unnecessary, and the entrance to the stack-room is through the registering-turnstile F, which works in only one direction, and thence to the reading-rooms through the doors A and B. The exit from all parts is through the turnstile E, which also works in only one direction. By making it necessary for every one to pass out by the delivery-desk through this turnstile, the temptation to carry a book away without having it charged is reduced to a minimum, especially since no one can feel sure that he has escaped observation at any time during his visit.

The basement contains a newspaper-room 21′ 6″ x 26′, a work-room 17′ x 17′, a boiler-room 13′ x 33′, men's lavatory, and an auditorium under the stack-room to seat 500. This has a separate entrance at the side from the street, or can be entered from the delivery-lobby by the staircase to the left of the vestibule, which descends into a *foyer*, 16′ x 25′, with entrances to the auditorium either side of the platform.

The general reading-room is fitted with 9 tables, each 3′ x 5′, with chairs to seat about 50 readers. In this room are the current periodicals in a rack, and a small collection of reference-books.

The children's room also contains 9 tables, 3′ x 5′, graduated in height to the various sizes of children. The chairs are also of various heights and sizes. Sixty children may comfortably be seated in this room at one time. All the wall-space to a height of about 5 feet is occupied by shelves holding 4,000 volumes, and the whole of the books of the children's library are kept in, and issued from, this room.

The next branch opened was the West-end Branch, January 31, 1899. This is a much smaller library than the Lawrenceville, and is without the semicircular stack-room. It also consists of 2 floors. In the basement are the workrooms and auditorium as before. The main floor is simply one large room. The central desk is placed in a similar position to that at Lawrenceville, with turnstiles either side, and the delivery-lobby is separated from the children's room and the general reading-room by railings of the same height as the turnstiles. The walls are shelved round the entire room. At the back of the delivery-desk is a small room, 16′ x 14′, projecting out from the main building. It is used as a small reference-room.

Both reading-rooms are smaller than those at Lawrenceville, being 30′ x 28′ 4″ each, and about 18 feet in height, fitted with 3 long tables, each 16′ 6″ x 30′. There are 16 chairs to each table in the general reading-room, and 18 in the children's. Its cost was nearly £4,000.

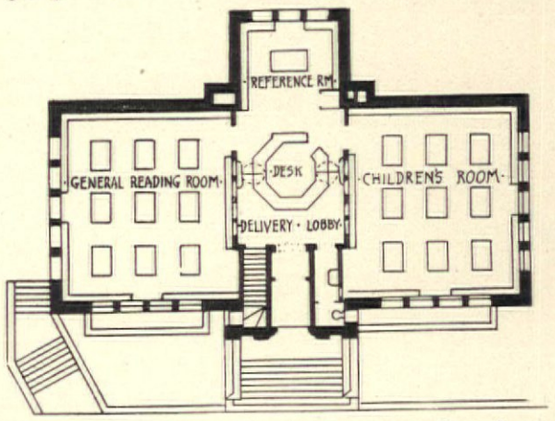
The branch at Wylie Avenue was opened in June, 1899, and practically follows the lines of the Lawrenceville, with its radiating stacks, but owing to the increased size of the reading-rooms to 37′ 6″ x 33′, giving another row of 3 tables, the stack-room is wider and not so deep. Its radius is 42 feet to about the centre of the delivery-lobby, not the delivery-desk as before, but the stacks radiate from the centre of the delivery-desk.

The Mount Washington Branch is modelled on the plan of the West-end Branch, except that glass-partitions separate the general reading-room and the children's room from the delivery-lobby. By this means a geater degree of quiet is ensured. The recess for reference-books in the rear of the delivery-desk is 14′ 6″ x 16″, and has a capacity of shelving 2,000 volumes. The other books are shelved in the 2 reading-rooms.

The turnstiles have been improved in several details, the entrance turnstile, marked F on the plan, having a frictional attachment which ensures a more accurate registration of the number of visitors. The exit turnstile, marked E, is fitted with a locking attachment, which is released by pressing a pedal located just where the charging-assistant stands within the delivery-desk.

The delivery-desk is octagonal instead of circular in form, and works more satisfactorily. On the inside it is fitted at the front with shelves for returned books, and with drawers for the shelf-list, which is kept on cards, and at the other side with drawers for borrowers' applications and cards. The case of drawers containing the card-catalogue is in the rear of the desk and faces outwards, so that it is readily accessible to borrowers.

The size of the general reading-room is 27′ 4″ x 30′, with 8 tables, seating 64 persons, 56 inches long, 39 inches wide, and 30 inches high.



First Floor: Carnegie Library of Pittsburgh, Pa., Mount Washington Branch. Messrs. Alden & Harlow, Architects.

Near the entrance to the room is an attendant's desk of the same size as the tables. The room has a shelving capacity of 5,200 volumes, the bookcases being 7 shelves high, except under the glass partition.

[1] A paper by Sidney K. Greenslade [*A.*], Pugin student, Grissell Medallist, Godwin Bursar, read before the Royal Institute of British Architects, Monday, March 17, 1902, and printed in the *Journal* of the Society. Continued from No. 1391, page 61.

In the children's room, of exactly similar size, the shelving is carried to the same height, the upper portion having a corticine-panel framed in oak. These panels altogether form a bulletin-frieze extending around the room, and make an excellent background for small framed pictures hung within easy reach of the children's eyes. The shelving capacity of the room is for 3,800 volumes. The tables (8) are of the same superficial area as those in the general reading-room, but are of 3 heights, 28 inches, 26 inches, and 22 inches, with chairs to correspond, 17 inches, 16 inches, and 14 inches high respectively. The room contains also an attendant's desk, similar to the general reading-room. Between the children's room and the vestibule is placed the women's toilet-room, the men's being in the basement. The children's room is fitted with a small cabinet wash-basin, compact in form, which folds against the wall behind closed doors when not in use. In the basement are placed the auditorium, boiler-room, store-room, workrooms, and men's toilet, etc.

The Hazelwood Branch was the last to be completed. Practically very little variation has been made. The seating capacity of the reading-room is one-third greater, the dimensions being 26′ 8″ x 38′ 6″, each having 12 tables; and the small reference-room is contained within the main lines of the building, just behind the delivery-counter. It is only temporary, until the stack-room is built over the existing semicircular auditorium. The fittings of the delivery-desk and shelving, etc., are exactly similar to the others.

Living quarters for the janitor are provided in a half-story above the main floor.

It is interesting to note the gradual development of these plans. The growth of what may be called the "turnstile control," resulting in the abandonment of the entrances to the reading-rooms from the delivery-hall, as adopted on the first plan, is important.

The apparent unfitness of the low railing separating the reading-rooms from the delivery-hall, as adopted in the West-end Branch, and substituted afterwards by screens in the later plans, is also worthy of note. Although the radial-stack plan is costly to build, yet the advantages where a "free access" policy is adopted are very great. The architects for all these libraries were Messrs. Alden & Harlow, of Pittsburgh.

NEW YORK CITY BRANCH LIBRARIES.

In a very few years the city of New York will have a most complete scheme of branch libraries in connection with its magnificent central one. Mr. Andrew Carnegie has given £1,000,000 to build 65 branches, and the Board of Library Trustees have just appointed 3 firms as an advisory board of architects to take the entire charge of the designing and supervising of these buildings, the firms so appointed being Messrs. McKim, Mead & White, Messrs. Carrère & Hastings, and Messrs. Babb, Cook & Willard. There will be a certain number of libraries built each year, and the above firms will confer and collaborate in the work. The result should be eminently satisfactory.

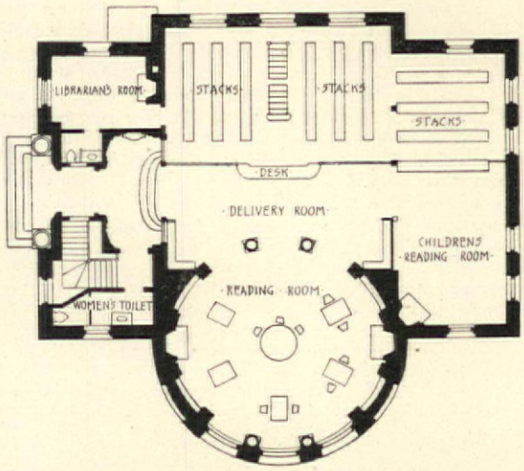
Among the branch libraries already built in New York, perhaps the Bloomingdale Branch will best serve as an illustration of the arrangements adopted. It is built on a site with a frontage of 43 feet and depth of about 60 feet. Lighting is only obtainable from the front and an area at the back. It consists of a basement and 3 floors above, and the whole of the main-floor area is open. The front portion is occupied by the delivery-space, about 23′ x 9′. Beyond, placed centrally, is the delivery-desk, enclosing a working-space for attendants 14′ x 7′. The rear of the room is divided by a bookcase, 7 feet high, into two, 2 tables for 6 readers being placed on either side. A portion by the side of the delivery-desk, to the front, is reserved for children. Bookshelves are placed around the walls to a height of 7 feet. Gates and low railings separate the delivery-space from the other portion of the room. The stairs to the upper floors are in the far right-hand corner, and are lighted from the area. The whole of the first floor is also open, and is used as the general reading-room. Book-lifts from the delivery-desk below are placed in the centre of the room. It is fitted with 12 tables for 6 readers each.

The upper floor is allotted to the janitor and for purposes of the travelling-library.

SMALL LIBRARIES.

In the State of Massachusetts the requirements of the small library have been particularly well studied. Hardly a village or hamlet is without one. Many of those around Boston are extremely successful. It was here that Mr. H. H. Richardson, about 1880, erected several that are well known, such as the Ames Library, at Easton, and those at Woburn and Quincy. The great feature of the plan he generally adopted is the alcoved main reading room, and in these alcoves all the books were shelved. The stack-room, as understood now, did not exist. This method has not been found wholly successful from the readers' point-of-view, although architecturally the general effect of the alcoves is good. Many of the recently-erected libraries have very simple and compact plans. Those at Wayland, Plymouth and Weston have been selected to illustrate this, and also because the buildings are quiet and well suited to their surroundings. Often the small memorial library fails because it is so monumental in character. The plan often adopted for this type consists of 4 rooms, the 2 reading-rooms either side of the domed central hall, and the stack-room in the rear. They are often just miniatures of large town libraries, and look out of place.

The little library at Wayland, Mass., is admirably planned. Practically the whole is one room, easily controlled from the attendant's desk, yet ingeniously contrived so that the reader when in the reading-room is not disturbed by the borrowers at the delivery-counter. From the inner hall there are 3 steps up into the delivery-room, which averages 12 feet wide by 33 feet long, with the delivery-counter,

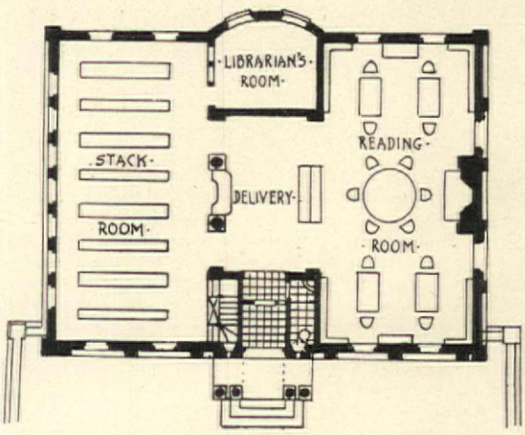


First Floor: Public Library, Wayland, Mass. Messrs. Cabot, Everett & Mead, Architects.

stack-room, and librarian's room to the left. To the right is the reading-room. Either side of the counter the stack is separated from the delivery-space by a low railing with gates in it. The reading-room is circular in plan, with a diameter of 32 feet. One-quarter of the circle is open to the delivery-room, divided into 3 openings of 6 feet each by 2 columns. It is fitted with 5 tables, 2′ 8″ x 4′, seating 2 readers each, and a circular table in the centre of the room, 6 feet 6 inches diameter, seating 6 readers. There are 3 large sash-windows, corresponding to the 3 openings from the delivery-room and opposite to them; and between are 2 open fireplaces, with bookshelves either side. The children's reading-room is beyond the delivery-room, and is 24′ x 17′, fitted with 2 tables seating 4 each. A stack, in which their books are shelved, to hold about 1,000 volumes, separates the room from a small room, 15′ x 15′, behind, practically a portion of the book-stack, which could be conveniently used as a small reference-room.

The stack-room is fitted with 6 rows of stacks, 3 on each side of centre, each row divided into 2 lengths of 6 feet each, with gangway between. Just at present they will take 10,000 volumes, but on the second floor further stack accommodation can be arranged for more than twice this number. The approach to this floor is from the staircase at the back of the delivery-counter only, so the storage accommodation for the size of the library is great. The architects were Messrs. Cabot, Everett & Mead, of Boston.

In the Russell Library, Plymouth, Mass., by the same architects, the scheme adopted is a smaller one, but similar in arrangement; generally the rooms are more open in plan, and there is no division between the stack and delivery room. A seat with bookshelves at the back separates the reading-room from the delivery-space. The stack-room to the left is 20′ 6″ x 40′, having 8 rows of stacks 12 feet long, with a total capacity of 13,440. Provision is made for a second floor; it is to be of glass, with a gallery towards the delivery-space; it is reached by a staircase in the front corner of the stack. The space



Russell Library, Plymouth, Mass. Messrs. Cabot, Everett & Mead, Architects.

over the librarian's room is occupied by a private study-room, the only room on the second floor.

The librarian's room on the first floor opens directly off the stack and is placed beyond the delivery-space. The reading-room to the right is 20′ 5″ x 40′ and 16 feet in height; it is well lighted on the three sides and shelved all around for books. It is fitted with 5 tables.

Unlike the majority of the small libraries, that at Weston is ⌟-shaped in plan. Directly opposite the long arm on the short side the entrance is placed, and directly beyond is the delivery-hall, 15 feet square. To the left, through an opening 14 feet wide, divided into three by 2 oak columns, is the reading-room. It is 44 feet long and 24 feet 6 inches wide, and very well lighted on three sides. It is fitted with 2 tables, each 13′ x 3′ 6″, and a circular one at the end of the room, seating altogether 22 readers. Between the columns on the right of the hall is a settle which divides off the children's small room, 11′ 6″ x 15′ 6″, also provided with a circular table seating 5. Both these rooms are fitted with wall-shelving between the windows. The book-room occupies the long arm of the ⌟. It is about 56 feet long by 30 feet wide. The opening between it and the delivery-hall is 14 feet wide, and is divided into three by 2 columns, like the other room. The delivery-counter is placed in the centre; a desk occupies the left opening, for the use of the librarian, and a gate is placed in the right one. The first 10 feet of it on the left is fitted for the librarian, and commands a view of all the rooms from her desk; beyond, it is divided into 5 well-lighted bays of 10 feet centres. There is a central 6-foot-wide gangway and small ones 3 feet wide at the walls. The stacks, which are of wood, 9 feet long and 8 feet high, have a capacity for shelving 11,340 volumes. This does not include the wall-shelving in each bay below the windows. Between these stacks, near the wall, are placed small fixed tables, each 18″ x 2′ 6″, supported by central cast-iron standards screwed to the floor, and fitted with a fixed stool at the wall end. A lift and staircase connect with the floor below the book-room, which is of the same area. This is an extremely convenient and well-arranged little library. The architect was Mr. Jenney, of Boston.

In conclusion I should like to express my great thanks and indebtedness to all the librarians and architects who so readily assisted me in my work, and particularly to those who kindly gave me plans of their libraries for the Institute. These courtesies, so generously shown, made my visit to America as Godwin Bursar a most pleasant one.

THE ROYAL PALACES OF LONDON.[1]

THE royal palaces of London have a special interest this year, when the English monarchy and its historic associations are vividly recalled to men's minds by the coronation of King Edward VII. Of these palaces only one, and that the least interesting — Buckingham Palace — is the residence of the King. St. James's still remains the official court and the scene of levees and investitures. But the glories of Kensington and Whitehall are wholly of the past.

Little or nothing is left of Whitehall, if we except the magnificent banqueting-hall. Yet the palace of Whitehall was for centuries the chief London residence of our monarchs, and no review of the royal palaces of London would be complete which did not take it into account. The original building of Whitehall was erected in the reign of Henry III by Hugo de Burgh, Earl of Kent and Chief Justiciary of England. At his death it passed either by will or sale into the hands of some Preaching or Black Friars, and they sold it in 1248 to Walter de Grey, Archbishop of York. From that time to the fall of Cardinal Wolsey, nearly three centuries later, it served as the London residence of the northern primates, and was called York House. As an archiepiscopal palace, York House was for long the centre of much ecclesiastical pomp and state. But it was Wolsey who raised it to its zenith; he rebuilt a great part of the palace, and added a hall and chapel. At York House this prince of the Church entertained with sumptuous magnificence; the splendors of his equipage and liveries, the costliness of his entertainments, and the profusion and extravagance of his household were never before equalled by any English subject, peer or prelate. But Wolsey's day at York House, though brilliant, was brief. Anne Boleyn was prejudiced against him, and King Henry VIII attributed to him the failure of the negotiations for the divorce of Catherine of Aragon; perhaps, too, the pomp and display affected by the Cardinal aroused the King's jealousy. Wolsey was ignominiously turned out of York House; the palace was seized by the King, and henceforth called Whitehall. Some authorities say that the unfortunate Cardinal handed the palace over to his rapacious master as a peace-offering in vain, others that the King took it without ceremony. However that may be, it is certain that Henry VIII got Whitehall for nothing, and could therefore afford to enlarge and beautify it. This he did in many ways, notably by obtaining land from the Abbot of Westminster, and enclosing it with a wall as a park "for his Grace's singular pleasure, comfort, and commodity," as Strype has it, "to the great credit of the realm." The King also added to the palace a spacious room for entertainments, a finer chapel, galleries, a cockpit, and a tennis-court. When all was completed Henry VIII came to Whitehall with his Court, and the palace henceforth became the principal London residence of our English monarchs until it was destroyed by fire more than a century later.

The succeeding Tudor sovereigns did little or nothing for Whitehall. James I on his accession found the palace sadly out of repair, and resolved to rebuild it on a regal scale. He consulted Inigo Jones, who prepared elaborate plans, far beyond his royal master's means or needs. They were only in part carried out, but the superb banqueting-hall remains to this day a witness of the magnificence of the architect's designs. For the rest, it has been well said that "the Whitehall of Inigo Jones is an unrealized dream."

Charles I at one time thought of carrying on the work begun by his father, and employed Rubens to paint the ceiling of the banqueting-hall, and commissioned Vandyck to paint the walls, but political troubles came all too soon, and Vandyck's commission was never executed.

After the Restoration, Charles II commanded Sir Christopher Wren to draw up plans for the improvement of Whitehall, but through lack of money nothing was done, and until the end Whitehall remained much as Inigo Jones had left it. Even so it was a truly regal palace, chiefly in the style of Tudor architecture, a large rambling building, or rather group of buildings, extending far along the river. . . .

After the death of Mary, William III came but rarely to Whitehall, possibly because his sister-in-law Anne, whom he hated, had lodgings there at one time. Four years before his death, in 1698, Whitehall was burned to the ground. As a royal residence it ceased to exist, and only the magnificent banqueting-hall remained to bear witness of what was once the stately Palace of Whitehall. After the accession of George I this hall was converted into a Chapel Royal, and it so remained until 1890, when it was dismantled as a place of worship. Many notable services were held in the Chapel Royal, Whitehall, not the least interesting being the thanksgiving service attended by their present Majesties and all their children the day after their silver wedding (March 11, 1888), when the eloquent Dr. Magee, Archbishop of York, preached.

Shortly after this event the hall was closed as a Chapel Royal. It was "lent" by Queen Victoria to the Royal United Service Institution, and has since been fitted up by that body for the exhibition of trophies connected with the history of the army and navy. . . .

The burning of Whitehall led to the recognition of St. James's as a royal palace. For though St. James's was first acquired by Henry VIII, it was not until the reign of William III that it became the accredited seat of royalty. The phrases, "The Court of St. James's," "The Palace of St. James's," date from the Revolution era — before then it had been "The Court of Whitehall."

The Hospital of St. James's, founded for the reception of "fourteen sisters, maidens, that were leprous, living chastely and honestly in divine service," was acquired by Henry VIII in the year 1532, by comparatively honest means, for though he turned the sisters out of doors he granted them pensions. The hospital was razed to the ground, and St. James's Manor-house was erected in its place, under the direction of Cromwell, Earl of Essex. Holbein is said to have furnished the plan, but this may be doubted. Henry VIII entered into occupation of his "goodly mansion of St. James's" at a time when his passion for Anne Boleyn was at its height, and carved on the chimney-piece of the presence-chamber may still be seen the Tudor badges and the initials H. A. intertwined — the cipher of the monarch lover and his swanlike bride. Anne Boleyn must have spent some of the happiest hours of her brief reign at St. James's, and have witnessed there many a stately masque. The King, perchance, associated St. James's with his wayward fancy for Anne Boleyn, for he seldom went thither after her tragic death, but repaired to his more commodious palace of Whitehall. Mary, his daughter, passed much of her time at St. James's. From its gates at her accession she rode in state to Whitehall with the Princess Elizabeth at her side. The Tudor sisters rode on white palfreys, gaily caparisoned, and followed by a brave show of ladies and knights. In St. James's, too, a few years later, Mary dragged out the last days of her inglorious reign, weeping over the loss of Calais, and sighing for Philip, her husband, who came not.

After Mary's death the course of events flowed away from St. James's. Elizabeth cared nothing for the palace, but she sometimes held receptions in the state apartments. James I went thither but little, and though he affected to be pleased that it bore his name, the magnificence of Whitehall appealed much more to him. So he made over the Manor-house of St. James's to his son Henry, Prince of Wales, who occupied it until his premature death. Charles I had a liking for St. James's, and most of his children were born there. So, too, had Queen Henrietta Maria, who lodged a colony of priests and friars in the Friary Court, to the great indignation of the Puritans. . . .

But it was not until the accession of George I that St. James's became actually the residence of the sovereign, a place to live in as well as the scene of levees and drawing-rooms. What Whitehall was to the Stuarts, St. James's became to the first two Georges. . . .

St. James's as a place of residence did not long enjoy the royal favor after the accession of George III. But it was to St. James's that Princess Charlotte of Mecklenburg-Strelitz came as the bride of the young King. When she first saw the palace she turned pale and trembled. The Duchess of Hamiliton, who had been sent to attend her, reassured her with a smile. "My dear Duchess," said the young Princess tartly, "you may laugh, for you have been married twice, but it is no joke to me." When the coach stopped, and the King came forth to meet her, she trembled and would have knelt at his feet, but he gallantly prevented this and embraced her. It is said that for a moment — only for a moment — he started with dismay, her portraits had made her so much fairer than she proved to be. But it was too late to draw back, and the "plain, awkward

[1] Extracts from a paper in the *Edinburgh Review* for July, 1902

German girl" became "good Queen Charlotte," of penurious and shrewish memory.

The eldest son of this union, George IV, was born at St. James's, and here for a short time King George and Queen Charlotte resided when in London, and held levees and drawing-rooms. But in 1763 they moved their household to Buckingham House. From that date St. James's Palace has never been the residence of the reigning sovereign, and for a time it fell into disfavor. . . .

Kensington Palace will be chiefly known to future generations as the birthplace and early home of Queen Victoria. The original mansion, of which, it is probable, some portion still stands, was the residence of Lord Chancellor Finch, afterwards Earl of Nottingham, and bore the name of Nottingham House. The estate included some park-land, now known as Kensington Gardens. King William III bought it from the second Lord Nottingham, as Northouck writes, "for its convenience and healthy situation, and for the King to reside in during the sittings of Parliament." Evelyn, in his "*Memoirs*," under date February 25, 1690–91, writes: "I went to Kensington, which King William has bought from Lord Nottingham, and altered. It is yet a patched-up building, but with the gardens, however, a very neat villa." The palace was considerably enlarged by William III and Queen Mary, from designs by Sir Christopher Wren, and prim gardens with straight paths and formal flower-beds were laid out in the approved Dutch fashion. William and Mary were very fond of Kensington, and spent large sums in altering and improving their newly acquired estate. Before the work was completed, Queen Mary died at Kensington of smallpox, December 28, 1694. When the nature of her illness was communicated to her she realized that there was no hope, and locked herself in her closet, where she spent the night in sorting and burning her private papers. A few days later she died. . . .

Anne was even more attached than her predecessors to Kensington, and though she did little to improve the palace, she devoted much time and thought to beautifying and enlarging the gardens, and spent hours pottering among her plants and flowers. The beautiful greenhouse or orangery was built by Sir Christopher Wren at her command. If there be such a thing as a "Queen Anne" style of architecture, this building may be regarded as its highest expression. It shows Sir Christopher Wren at his best. Queen Anne used to come to the orangery sometimes to drink tea, and here she often sat squabbling with the haughty Sarah, Duchess of Marlborough, or gossiping with the cunning Abigail Hill, Lady Masham. Anne died at Kensington from a stroke of apoplexy, brought on by the strife and contention of her ministers, and her sudden death defeated the ill-matured plans of the Jacobites. . . .

George I was fond of Kensington, which reminded him, more than other English palaces, of his beloved Herrenhausen. Sir Christopher Wren having been turned out of his place by a base Court intrigue, William Kent, a man immeasurably his inferior, was appointed in his stead, and to him George I gave orders for the erection of a new and additional suite of state-rooms, including the famous cube or cupola room, a gorgeous chamber of the pseudo-Classical style, with painted and gilded walls, and a gaudy domed ceiling of blue and gold. . . .

On the accession of George II and Queen Caroline Kensington became one of the favorite residences of the Court. Queen Caroline's drawing-room, built and decorated by Kent, was the scene of many an interview between her and Walpole. Here together they concocted schemes for the management of the King, and here, too, Caroline would often give audience to malcontent nobles, like Lord Stair, and endeavor to win them over to the side of the Government. Caroline was devoted to gardening, and with the assistance of Kent, who was a better landscape-gardener than an architect, she planned many alterations in Kensington Gardens. It was she who made the Round Pond, turned a string of smaller ponds into the Serpentine, and laid out the Broad Walk and many of the smaller avenues. Under Queen Caroline the Kensington promenades were revived, and became more frequented than ever. The King and the Queen were very fond of walking, and, accompanied by the princesses and attended by a numerous body of courtiers, they would give many informal audiences in Kensington Gardens in the course of their morning walk. George II died at Kensington Palace twenty-three years after the death of his Queen. With him the glory of Kensington as a royal residence to a great extent departed. . . .

The state-rooms at Kensington Palace have been carefully restored, and by command of her late Majesty are now open to the public. Here may be seen Queen Mary's privy chamber, Queen Anne's private dining-room, the magnificent king's gallery, the cupola-room, Queen Victoria's nursery, and many other apartments. But the most interesting of all, the room in which Queen Victoria was born, and the room in which she held her first Council, are not shown.

Buckingham Palace has been left to the last, for it possesses few historic memories and has the reputation of being the ugliest royal palace in Europe. The reputation is not altogether deserved, as those who have witnessed the gloomy and forbidding barracks which do duty as royal palaces in some of the capital cities of Europe can testify. From the garden-front, at least, Buckingham Palace has a certain stateliness which is not unworthy of the principal London residence of the King. In the far-away days when the Court disported itself at Whitehall the site of Buckingham Palace was known as the Mulberry Garden. This garden was a fashionable resort during the reigns of Charles I and of Charles II, and was the scene of many gay comedies. There was a house adjoining the Mulberry Garden known as Goring House, which was later purchased by Lord Arlington, and rebuilt on a larger scale, and styled Arlington House. This was demolished in 1703, and upon its site John Sheffield, the magnificent Duke of Buckingham, built a mansion and named it Buckingham House, situated, as he says, "in a little wilderness full of blackbirds and nightingales." . . .

George III and Queen Charlotte were looking about for a mansion which would serve them as a London residence in the place of St. James's Palace, which they both disliked. Buckingham House was therefore purchased by the King and settled upon Queen Charlotte as her special property and called Queen's House. The royal pair entered in possession of their new London home, which was then a commodious red brick mansion surrounded with beautiful gardens. To make the grounds even larger a portion of the Green Park was added. Here "Farmer George" and his Queen lived the quiet domestic life they loved so well, all state functions taking place at St. James's Palace; but later, when the grand saloon at Buckingham House was fitted-up as a throne-room, Queen Charlotte held her smaller drawing-rooms there. . . .

The King and Queen were at Queen's House the night when the Gordon Riots were raging, and the troops which guarded the palace had no straw to lie upon. "My lads," said the King, "my crown could not purchase straw for you to-night, but depend upon it I have given orders that a sufficiency shall be sent here by to-morrow noon. As a substitute for the straw my servants will instantly serve you with a good allowance of wine and spirits to make your situation as comfortable as possible, and I shall myself keep you company till to-morrow morning." He kept his word, and sat up all night with the officers in the Queen's Riding House, sending messengers every now and again over to St. James's Palace to report on the proceedings of the rioters who were trying to force an entrance there.

When George IV came to the throne, the "Queen's House" was in a very dilapidated condition, and the King determined to rebuild it. He had not long finished his grotesque pleasure-house, the Pavilion at Brighton, and as there was a little difficulty about getting the necessary supplies from Parliament to build a new palace in London, he cunningly asked for a grant for "the enlargement and repair of the Queen's House and got it." Nash, the architect, had the King's command to keep up the fiction of repair, but very soon the Queen's House was transformed into the King's Palace of Pimlico. George IV, with all his faults, had a sense of the magnificent, and he dreamed of a palace which should rival those of ancient Rome. The palace grew and grew, and a notable feature of the "repairs" was the magnificent marble arch copied from that of Constantine at Rome, upon which an equestrian statue of the King was to stand. This statue was never placed there, and, shortly after Queen Victoria's accession, the Marble Arch was banished to the Oxford Street entrance of Hyde Park. The King's repairs and additions cost half a million of money, and by the time they were finished every trace of the original structure of Buckingham House was lost. The work was not ended when George IV died, and his successor, William IV, swore that the palace was a monstrosity, and declared that nothing would induce him to live in it. So it remained uninhabited and deserted, surrounded by a wilderness of sandy gravel, until Queen Victoria came to the throne.

The young Queen declared that she liked neither Kensington nor St. James's, but would in the future make the King's Palace at Pimlico her London residence. The palace was soon finished and upholstered, and the Queen decided that she would call it in future Buckingham Palace. In July, 1837, she quitted Kensington and drove through cheering crowds to her new home, passing under the Marble Arch, whereon the Royal Standard floated for the first time. In the early years of Queen Victoria's reign Buckingham Palace was considerably altered and improved. The magnificent ball-room was built and the gardens were beautified under the direction of the Prince Consort. Though, after her husband's death, she resided in London but little, Buckingham Palace was always the centre of Queen Victoria's life in the metropolis during her long reign of sixty-three years. She drove from it to her coronation and her wedding, and here many of her children were born. From its windows she watched the funeral of the great Duke of Wellington passing to St. Paul's, and from the balcony she waved farewell to her Guards as they set forth to the Crimea. Through the great bronze gates of Buckingham Palace Queen Victoria passed to the thanksgiving of her Jubilee in Westminster in 1887, and ten years later they swung open again when the aged Queen went forth to celebrate with her people her Diamond Jubilee.

PROFESSIONAL OBLIGATIONS.

THERE are few men in the profession who are capable of managing their clients, though they may be quite competent in their own business and in other ways. Yet this power of management is very essential to a successful conduct of business. The cantankerous or litigious client is extremely difficult to manage, for he seems always thinking that he is being worsted. This belief haunts him night and morning, and he is always trying to find out a mistake or pick a quarrel with architect or builder. And here it is

where a knowledge of men and business tact are so essential to the profession. They cannot learn it from books: it can be only mastered by experience. The cantankerous client is very sensitive; he resents anything which seems to him to be a slight or an inattention, and, therefore, the best way is to meet him half-way, to humor him in small things, to be tactful, to consult him now and then, his likes and dislikes, and so to win his friendship and confidence as far as possible without giving oneself away. But the tactful behavior is not everybody's *forte*. In nine cases out of ten the architect puts his back up, goes the wrong way to conciliate, gives orders without consulting, and is in the habit of doing the wrong thing or at the wrong time. The management of a client of this kind can only be got from a long personal acquaintance with him, his tastes and whims, and it is this study of the personality of the client that is so often lost sight of by the profession. . . .

There are several matters of contract with which the architect is often unfamiliar. His relation to the contract is of the first importance. As an agent of the employer he is answerable for acts of negligence, and in this capacity he is liable for six years, and payment does not relieve him from his liability; but he is not liable to the contractor unless for fraud or collusion. And what does this agency or liability imply? His client expects of him a knowledge of the law in regard to buildings; he ought to know the general law of contract, the law of easements — as light and air, rights of property, party-walls, etc.; he should be practically acquainted with the Building Act, local Acts, by-laws and regulations, sanitary and otherwise. These constitute a considerable knowledge of municipal and statutory provisions; he cannot delegate his duties to another; he is also liable to his client for the faults and errors of his assistants. But the architect is not so much a general agent of the employer as a special agent, and this limitation is important. Thus he is appointed to see that his plans are properly carried out, and this involves good foundations, sound walls and floors, drainage and other structural matters, responsibility for defects of design, and all injuries sustained by collapse, or errors in estimating cost. A most important duty often neglected is that relating to the rights of building and adjoining owners on party-walls, and a thorough knowledge of the schedule and provisions of the Building Act is necessary. Many an architect has come to trouble owing to his neglect of a knowledge of light and air. Plans have been prepared and building operations commenced, when a complaint is made that the new building will obstruct the light that comes to a window which has had an uninterrupted enjoyment of it for the prescribed period. It is then found that the owner of dominant tenement has a right, and that the building must be stopped, or alterations made to avoid the consequences. And his knowledge of the law must be up to date. For example, recent decisions on the question of the amount of lateral light that can be acquired by long enjoyment have to be studied. . . .

There is much misunderstanding prevalent in the profession about the ownership of drawings for buildings not proceeded with. The law has decided that the employer can claim the drawings if no agreement to the contrary has been made; if the building is carried out, the architect has been ordered to deliver the drawings, though on insufficient grounds. But in either case the architect can make his own terms.

A great deal often turns on the real meaning attached to the usual contract-clause "In case of any dispute arising between the parties, the architect's decision in the matter shall be final and binding." He can decide solely by his skill or judgment, without hearing the parties; he is acting in the position of a quasi-arbitrator, who gives his decision without having to inquire into the matter of dispute between the parties; he is in the position of a valuer or a "dispute preventer." The architect in this case acts upon his own judgment on the facts. But when he is appointed by two or more parties to determine or value a matter after a dispute has taken place, and to settle that dispute, and he is expected to hear evidence, then he is acting in a judicial position as arbitrator. Neither employer nor contractor can dismiss an architect who is acting as a quasi-arbitrator — an important difference between the architect who acts merely as an agent and one who acts as dispute-preventer or quasi-arbitrator. It is well for the architect to keep in mind these two functions of his work — that of an agent and that of a quasi-arbitrator — being responsible to his clients in certain duties, and holding also a position of dispute-preventer between the parties to the contract. By having a clear conception of what these functions imply, he may be saved many mistakes and misgivings, while he will be able to maintain a firmer attitude towards his employers and the contractor. As arbitrator or quasi-arbitrator he is not the agent of either party, for he is acting for both; hence, he is not responsible to either of them for his acts, as, for instance, in giving certificates, ordering extras, and making valuations, which are binding alike on both. This independent position ought to save him from much annoyance and threats of dismissal, or to appoint another architect to decide points under the contract. It could only be by the joint action of both parties to the contract that another architect could be appointed. An architect has an implied authority to do many things, such as to instruct a quantity-surveyor to prepare quantities, to order certain things, to give final certificates — all of which things he could not do if he were not a special agent, or if, for example, he had been engaged only to supply a set of drawings for a builder to carry out independently, in which case he is not an agent, but a draughtsman. — *Building News.*

THE NEW ITALIAN LAW ON DEALINGS IN ART.

THE Roman correspondent of the *London Morning Post* transcribes from the *Official Gazette* the new law regulating trade in artistic and archæological objects, and recently adopted by the Italian Parliament. That the authorities are resolved to protect the artistic interests of the State in the most practical manner is shown by the following interesting passages in the correspondent's letter: —

"All artistic or archæological collections, monuments or isolated artistic objects belonging to the ecclesiastical authorities and to corporations recognized by the State cannot be sold out of the country, and can only be sold in Italy by one religious or public authority to another, or to the State, with the permission of the Government. A general catalogue of pictures, monuments and archæological objects is to be drawn up, one part of the catalogue to include the objects and collections belonging to the above-mentioned corporations and authorities, and the other to include all objects and collections belonging to private owners, provided that these collections are considered to be of high artistic value. Objects not included in the catalogue may be sold, but only with the permission of the Minister of Public Instruction. Owners of objects registered in the catalogue must immediately notify the Ministry of Public Instruction in case of sale or change of ownership. Sellers must always warn buyers when an object they are about to purchase is registered in the national catalogue. The Government will always have the right of preëmption, under equal conditions, in case of such sales, but the right must be exercised within six months of the notification that a sale is contemplated. When the right is exercised in regard to an object for which an offer has been made from abroad, the price will be fixed by deducting the export duty from the amount offered. The export duty is progressive, and amounts to 5 per cent up to the first £200 of the price, 7 per cent on the next £200, 9 per cent on the third £200, 11 per cent on the fourth £200, and so on until the maximum of 20 per cent is reached for costly objects.

"Article 8 of the law contains a provision which, if properly applied, would stop the practice of declaring the value of an object to be infinitely lower than it really is. Exporters of valuable pictures and other objects which may be worth, say, £5,000 will often declare their value to be £15 or £20, not so much in order to avoid payment of the export duty (which will, in any case, be paid by the foreign purchaser) as to avoid arousing the suspicion of the Government experts that a good picture may be going out of the country. It does not say much for Government experts that, in order to tell a valuable picture from a worthless one, they should need to see a high declaration of price, yet this is frequently the case, and during the last few years many a valuable work has easily obtained a permit for exportation because its value was declared at £12, instead of £1,200. Article 8 of the new law, however, says that the Government will have the right to buy all objects for which permission to export is requested at the price declared by their owners, less the export duty. The purchaser of a valuable picture will think twice before declaring its value to be only a few pounds, because he will know that in case of suspicion he would be bound to accept the few pounds, less 5 per cent, from the Government as the price of a picture for which he may have given £1,000. The net effect of the new law will probably be to kill the trade in authentic pictures, and to stimulate the production of those ingenious forgeries which do not figure in trade-returns as the staple article of Italian commerce, but which certainly bring more money into the country than the usual commodities for exportation."

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

COMMENCEMENT HALL: SWEETBRIER INSTITUTE, AMHERST CO., VA. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

THE GREAT COURT, FROM THE RESIDENTIAL QUAD: SWEETBRIER INSTITUTE.

SCIENCE HALL AND INDUSTRIAL BUILDING: SWEETBRIER INSTITUTE.

[The following named illustration may be found by reference to our advertising pages.]

NEW SCOTLAND YARD POLICE STATION, PARLIAMENT ST., WESTMINSTER, ENG. MR. J. DIXON BUTLER, ARCHITECT.

THIS plate is copied from *Building News.*

[Additional illustrations in the International Edition.]

HOUSE OF MRS. MOEN, 121–5 BAY STATE ROAD, BOSTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

THE LIBRARY, FROM THE UPPER TERRACE: SWEETBRIER INSTITUTE, AMHERST CO., VA. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

ON THE UPPER TERRACE: SWEETBRIER INSTITUTE.

NOTES AND CLIPPINGS

THE HERMES OF CYTHERA. — M. André, the French artist, says the Athens correspondent of the *Times*, receives 20,000 francs for restoring the great bronze Hermes that was found in the sea off Cerigo in fragments. Dr. Charles Waldstein pronounces the figure to be a work by Praxiteles or of his school, and he and other experts declare that it is undoubtedly the finest Greek bronze yet discovered. At the same time was found a marble figure of a wrestler — strikingly like a Parthenon metope now destroyed, but known through a drawing by Jacques Carrey — in workmanship of the Rhodian or Pergamene school, and Lysippan in type.

FERRO-CONCRETE. — An interesting article on "Ferro-Concrete and its Applications" appears in last month's issue of the *Engineering Times*, from the pen of Mr. L. G. Mouchel. It is some years since the idea was formed of moulding concrete with the addition of a metal skeleton, but for some time the system was employed in a timid and tentative manner. Recently, however, the French Government created a separate Department of the Ministry of Public Works to give attention to all matters relating to ferro-concrete construction, with a view to its greater development. The Hennébique system of ferro-concrete, which gained for its inventor the Grand Prix at the last Paris Exhibition, consists of a combination of Portland-cement concrete and steel, in such a manner as to form a beam in which each of these two materials would develop the maximum of its inherent properties — the concrete, of course, acting in compression, and the steel in tension. Ferro-concrete has been adopted in the foundations of heavy buildings in this country, notably in the case of the big flour-mill and grain-elevators erected at Swansea for Messrs. Weaver & Co., and a warehouse at Newcastle-on-Tyne for the Coöperative Wholesale Society. The foundations of the Swansea buildings consisted of ground made of sand and rubbish brought over as ship's ballast and tipped on the soft mud in the estuary of the Swansea River. A sill of this ferro-concrete underneath the foundations has been found to ensure perfect stability. — *Stone Trades' Journal.*

GASOLINE AUTOMOBILES. — The Boston Manufacturers Mutual Fire Insurance Co. sends out the following admonition: "We learn that in some cases members or others in charge of risks insured by this Company are making use of the gasoline automobile. However safe or otherwise these machines may be upon the road according to their kind, their care, housing and charging are subject to the special hazard of gasoline vapor. In view of the number of bad accidents in the charging-room of these machines, caution is given that the place for housing and charging gasoline automobiles should not be in any of the insured premises within the mill-yards covered by our policies. If they are brought into the mill-yard a separate building, uninsured, should be put up for housing and charging. That building should have *bottom* ventilation directed toward the outside of the yard, downhill if possible, vents at the floor-level or below, so that the heavy gasoline vapors may drain away as fast as made. We have urgent reason for giving this caution, not from any loss or damage to insured property, but from bad accidents which have occurred within the month to one of our most valued clients."

LIGHTING BY MEANS OF ALCOHOL. — Although the flame of pure alcohol is not luminous, it may be made so by carburizing the spirit with the addition of 35 to 60 per cent of coal-tar benzine; or the flame of uncarburized alcohol may raise to incandescence a mantle of the rare metals as in incandescent gas-lighting. Hence, the two main divisions into which alcohol lamps may be classed — those with free flame from carburized spirit, and those with uncarburized spirit and incandescent mantle. The lighting exhibits at the Paris Industrial Alcohol Exhibition were practically divided into three categories, viz.: — (1) Lamps (for lighting streets, stations, works, etc.) of 60 to 800 candle-power, consuming from 1 to 1.6 gramme (1 gramme is 1.30 ounce) of debased alcohol per candle-power per hour, or of 100 to 1,000 candle-power, consuming from half a gramme to 1 gramme per candle-power per hour; (2) incandescent lamps of 12 to 50-candle-power for domestic use, consuming from 1 to 3 grammes of carburized or uncarburized alcohol per candle-power per hour; and (3) lamps of 8 to 15-candle-power, consuming from 6 to 8 grammes per candle-power per hour. Outside these categories, the jury granted a silver medal to M. Laurent for his application of electricity and use of carburized air to the lighting of incandescent lamps from a distance; and a work of art was awarded to the Société La Washington, of Paris, for its collective exhibits under two of the above-named categories. This company also received a gold medal for its lamp of high power, with two or three mantles and independent reservoir for carburized or uncarburized alcohol. — *Journal of the Society of Arts.*

MICHAEL ANGELO'S "DAVID." — The referendum has hardly made its way into the world of art, and the Society for the Protection of Old Florence probably has pioneer honors in asking the art-lovers of the world to pass on a matter of local interest. The point at issue is the erection in the Piazza della Signoria of a marble copy of Michael Angelo's colossal "David." The original, now preserved in the Academy of Fine Arts, was made for this square, as all the world knows, and there it stood for more than three centuries, until it was removed in 1687 to save it from the destructive effects of the weather. Meanwhile a bronze copy was set up on the outlying terrace below San Miniato. It is now proposed to place the marble replica where the original stood, and the opinion of all art-lovers is asked upon the project. This, it will be seen, is a revision of the preference of the sculptor and his Florentine patrons, some centuries after the event. It will be curious to see whether a plebiscite of modern art-lovers will bear out the taste of the early sixteenth century. A favorable vote might only indicate respect for tradition; an unfavorable vote would show that the contemporaries of Rodin and Saint Gaudens are quite ready to set those of Michael Angelo right. Such a disposition has been shown in recent criticism of the plan for rebuilding the Venetian Campanile. — *N. Y. Evening Post.*

COLLAPSE OF A GERMAN CEMENT TRUST. — Consul Albert, at Brunswick, informs the State Department that the efforts of the German cement syndicate to control the production and to regulate the prices of cement have failed, and the syndicate has been dissolved. In the last two or three years, so many new factories have sprung up that it was impossible for the syndicate to bring them all under one management, and the competition which has ensued has been disastrous to the trust. At the same time, dissensions have arisen within the syndicate. The struggle has culminated in a conflict of extermination between the larger factories and the smaller. Prices of cement have fallen so that they are now at least 20 per cent below the cost of production of the most capably managed works. The domestic consumption and export in Germany amount to about 14,000,000 barrels, and the productive capacity of the factories is 30,000,000 barrels, or more than twice as much; consequently the factories can only work at half their capacity, and the supply of cement on hand is so great that it has to be stored. — *Exchange.*

BOGUS ANTIQUES. — The remarkable disclosure, that one of the ancient Roman statuettes in the Museum at Vienna is found to be rich in tobacco products, and to be, in fact, indisputably made from the worn-out mouthpieces of pipes and cigar-holders, will send a shock through all the cabinets (with a small c) in Europe. It is now asserted that the majority of the antique works of art of this description are the work of contemporary Greeks who appear to have made this unsavory industry theirs. As Lord Macaulay has it in a well-known Lay: —

> Such cunning they who live on high
> Have given unto the Greek.

We may even adapt another line from the same source, by the alteration of one word, to form a motto for the collector of such curiosities: —

> Leave to the Greek his amber nymphs!

— *London Daily News.*

ENGLISH STATESMEN AS GARGOYLES. — Lord Salisbury has not received the rare honor of having had his statue erected while he is still living. Such honor is usually reserved for royalty, though Calcutta boasts a statue of the Marquis of Lansdowne as a memorial of his Indian Viceroyalty. But the visitor to St. Giles, Camberwell, may see among the gargoyles Lord Salisbury with the ears and legs of a dog. Mr. Gladstone is hard by with wings growing from his shoulders, while Lord Randolph Churchill, with open mouth, in the act of speaking, keeps company with Mr. Bradlaugh (his head horned) and John Bright. The faces of Lord Beaconsfield, Mr. Gladstone, and Lord Randolph Churchill, figure on the gateway of Magdalen College, Oxford, and Chester Cathedral has a gargoyle portrait of Lord Beaconsfield. On the western porch of St. Albans Abbey Lord Grimthorpe (its restorer) figures as an angel with wings and whiskers, and Lord Roberts has been recently portrayed in a Boer War memorial window in a Bristol church. — *London Chronicle.*

PIERRE DE FRANQUEVILLE'S STATUES. — A marble "Apollo" by Pierre de Franqueville is on exhibition in Paris, where little of this old French sculptor's work is to be seen. Born at Cambrai in 1548, he was the despair of his father, who had no belief in the career of an artist. Escaping to Paris from parental tyranny in 1564, he worked his way to Italy, and became an assistant of John of Bologna, or Jean Boulogne. For the Salviati Palace in Florence he made the "Apollo" now in Paris. England contains the largest number of his works; no less than eight of his statues decorate the terrace of Windsor Castle. They symbolize Evening, Spring, Summer, Autumn and Winter. Three represent Diana, Vulcan and Bacchus, while a group of two figures shows Pan and Orpheus. "These exquisite marbles," remarks a London paper, "are the work of French hands, and the man who executed them was paid five crowns a day and his food by a Florentine prelate. It is more than three centuries since these statues were evolved from the marble block, and there are many people in France who do not know of their existence and have no knowledge of the marvellous man who wrought them." — *N. Y. Times.*

A SKELETON FOUND IN THE WHITE HOUSE. — While, a few weeks ago, the workmen engaged in repairing the White House were excavating, a massive stone vault was encountered. It proved to be apparently the foundation walls of an old house, that had evidently stood on the same spot where the White House was afterward erected. Here was found a portion of a human skeleton. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, SEPTEMBER 6, 1902 No. 1393

CONTENTS

SUMMARY: —

The Matter of Rebuilding the Tower of St. Mark. — South American Railway Engineering. — The "Nitrate King's" Estate, "Avery Hill," near London. — Safety-valves and Boiler Explosions. — The Interior Order of the Parthenon. — Peculiarities of other Athenian Buildings. — The Babylonian Tablets at the University of Pennsylvania. — Advice given by the Section of Tree-planting of the United States Bureau of Forestry. — The Electric Railway to Chamonix. — This Year's Prix de Rome. 73

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES. — IX. 75

"FIREPROOF WOOD," SO-CALLED. 75

A BRITISH REPORT ON OUR IRON TRADE. 78

CHRIST CHURCH CATHEDRAL, OXFORD. 79

THE GERMANIC MUSEUM, NUREMBERG. 79

ILLUSTRATIONS: —

United States Post-office, Rome, N. Y. — "The Parkview," Central Park West, New York, N. Y. — House of William Power Wilson, Esq., Granby St. and Bay State Road, Boston, Mass.

St. Mary's Catholic Church, Dundee, Scotland.

Additional: Entrance: House of William Power Wilson, Esq., Granby St. and Bay State Road, Boston, Mass. 79

NOTES AND CLIPPINGS. 80

THE comments of the professional and other journals on the question of the reconstruction of the Venetian Campanile are extremely interesting. Undoubtedly, Mr. C. Howard Walker will prove to have been right in his opinion, that a considerable part of the lower portion of the shaft will be found still standing, and that the foundations are practically undisturbed; so that a reconstruction on the same spot seems to be justified, not only by the sentiment which wishes to see the Campanile, if restored at all, occupy the same spot on which it stood for more than a thousand years, but by considerations of economy. As to whether it should be rebuilt at all opinions differ. The Paris *Figaro* has interviewed a large number of artists on the subject, beginning with Ziem, the great painter of Venetian scenes. He, it appears, does not wish to see it reconstructed; and many other painters and sculptors agree with him. In particular, they fear that architects may be allowed to play their "antics" about the tower. Among the architects, who, naturally, look on the matter with less sentiment, and a calmer conception of the artistic relations of the Campanile, the opinion seems to be general that the long, low buildings surrounding the Piazza of St. Mark, made still lower in effect by the strong horizontal lines of their arcades, need, to give them picturesque effect, the contrast of the lofty vertical mass of the tower. Whether the Campanile should be rebuilt exactly as it stood before is, however, a question about which architects differ. The editor of the London *Builder* gives vigorous expression to the opinion, in which we cannot quite agree with him, that the "packing-box" story, as he calls it, between the arcaded loggia at the top of the shaft and the pyramidal roof, never was anything but an unstudied and ungraceful makeshift to gain extra height, and should not be repeated. It is true that this story, decorated only by a coarse inlaid panelling, was heavy and uninteresting in appearance, but it served to give to the upper part of the tower a silhouette which was not only, to our mind, pleasing in itself, but was so characteristic of Venice, that, merely as a matter of sentiment, it would be a pity to change it. We remember a considerable number of Italian bell-towers, from that at Florence to some in Rome, and while the detail and proportions of the shafts of many of them are much more beautiful than those of the Venetian Campanile, none have an outline so well suited to the picturesqueness and variety of the group of buildings surrounding the Piazza. At the same time it would be easy to preserve the outline, without reproducing the coarse ornamentation, and, notwithstanding the opinion of those who would like to have the Campanile not only rebuilt, stone by stone, and brick by brick, but painted over after completion to imitate the "patina" of age, we should not object to seeing the "packing-box" story made beautiful and interesting by sculpture or otherwise, as a memorial of the rebuilding. As to Sansovino's Loggetta, which could hardly be improved upon, it is, fortunately, quite possible to restore it exactly in its former shape, and, practically, out of its own fragments; so that there is no reason why our children should not see the Campanile substantially as we have seen it, but with added beauty and interest.

THE people of the United States might with advantage interest themselves in the South American States, which have utilized the long interval of peace that they have enjoyed to enter upon a career of internal and commercial development which promises to be a brilliant one. Several new railways have been begun, on both sides of the Andes chain, and, before long, the plains of the upper Amazon and the La Plata will undoubtedly be made readily accessible to us by railways from the Pacific Coast. As pieces of engineering, some of the new lines are of rather startling interest. The last one, which is to cross the Andes from Lima, by way of Matucana, has already been constructed to its highest level, in the Paso de Galera, where it penetrates the ridge dividing the Pacific from the Atlantic slope by means of a tunnel, two miles long, at an elevation of nearly sixteen thousand feet above the sea. It is not surprising to learn that there is a fine view from the summit of the pass, and that trains stop fifteen minutes at the station at the entrance of the tunnel, to give passengers an opportunity of enjoying it.

A FEW years ago, Colonel North, the "Nitrate King," as he was called, who had made an enormous fortune out of the Chilian deposits of nitrate of soda, undertook to build a mansion at Eltham, near London. He secured eighty-four acres of land, and built a house which is said to have cost, with the out-buildings, about a million dollars. For a time, the mansion and estate, which were known under the name of Avery Hill, formed the topic of endless illustrated articles in the professional newspapers. In the end, Colonel North quarrelled with his architect, Mr. Cutler, and their relations ended in a lawsuit, which turned out, we believe, in Mr. Cutler's favor. Not long afterwards, Colonel North died, and the property, after lying idle for some years, has at last been sold, for one hundred and twenty-five thousand dollars, to the London County Council, which will make a public park of the grounds, and will utilize the mansion in some way to be hereafter determined.

AN instructor in science at the College of the Sorbonne, in Paris, M. Fournier, has made a study of boiler explosions, a large portion of which he thinks to be due to the inefficiency of the safety-valves in common use. As he observes, a safety-valve which is held to its seat by a spiral spring, as is the case with those on small and cheap boilers, never shows at the valve, when open, a pressure so great, by many pounds to the square inch, as that which actually exists inside the boiler, for the reason that as soon as the valve opens in the slightest degree, the escape of a portion of the steam just under the valve reduces the pressure of the remainder. Supposing the safety-valve to be set to open, for example, at one hundred pounds to the square inch, while it will begin to leak steam at that pressure, it cannot be held open until the boiler pressure is far beyond that, as the pressure required to hold it open must be one hundred pounds to the square inch plus whatever is lost under the valve by the escape of a portion of the steam. Moreover, as, with a cheap valve, the force of the spiral spring increases greatly as it is compressed by opening the valve widely, while the wider opening of the valve reduces still more the local tension of the steam, it follows that to hold the valve up, so as to keep an annular opening around it equal in width to one-fourth the diameter of the valve, which is necessary to give free escape to the steam, requires a pressure inside the boiler far greater than that at which the safety-valve is set, the difference varying with the spring, the pressure and the size of the valve. In this country, the simple spring safety-valve is only used on the cheapest boilers, our engineers having long understood its defects, but M. Fournier's interesting paper will be useful, even here, as showing clearly the nature of the danger attendant upon its employment.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.

Entered at the Post-Office at Boston as second-class matter

MR. LAURENCE HARVEY, who has just made a visit to Athens, writes to *La Construction Moderne* a letter which will interest architects, and, particularly, those American architects who have made a scientific study of the monuments on the Athenian Acropolis. Mr. Harvey, it may be remarked, belongs to the modern school of architects, in that he likes to compare the information furnished by poets and essayists in regard to architecture, with the evidence of his own senses, and, occasionally, with the conclusions which his trained intelligence suggests to him. Studying, before the ruins of the Propylæa, the rapturous description of Baedeker's *Guide*, he was surprised to read that the interior columns, of the Ionic order, were three feet two inches in diameter at the foot, and thirty-three feet seven inches high. This would make them nearly eleven diameters high, and, as a conscientious pupil of the École des Beaux-Arts, he was not prepared to admit that an antique example of the order could be so abnormally slender. Moreover, the height given by Baedeker would bring the capitals of the interior columns to a level with the cornice of the exterior order, and, as it is to be presumed that the portico was covered with marble slabs, like other structures of the kind at that period, it is obvious that the covering, with interior columns of the height given, would show from the front above the cornice. As this is hardly admissible, Mr. Harvey concludes that the interior columns, of which only the bases and a few fragments remain, were probably of the same height as the exterior ones, which would give them a proportion of nine diameters, and that they carried architrave blocks, at the same level with those of the exterior order, on which the marble ceiling slabs could rest safely; and this view is confirmed by the fact that an architrave block, apparently belonging to an interior order, still lies on the ground among the other fragments of the building.

MR. HARVEY, in speaking of other Athenian buildings, gives expression to a thought which has probably crossed the minds of many other architects, that the Greeks, notwithstanding their exquisite keenness of perception, and sense of beauty, did not always show that completeness of conception of their buildings which a modern architect regards as necessary, and which is so characteristic of the mediæval period. In the Theseum, as he points out, the columns of the porticos are laid out without any regard to the ceiling panels, and, in consequence, the marble slabs of the latter are sustained by stones placed almost at random, or, at least, corresponding neither with the colonnades nor with the walls of the cella; and, in order to find a support for some of these stones, it has been necessary to raise the ceiling of the western portico about eight inches above that of the lateral porticos. In the same way, the northern portico of the Erectheum, beautiful as every one acknowledges it to be, is longer than the front of the building behind it. The fact that this brings the opening between the two middle columns, and the door behind them, out of the axis of the main body of the temple would not, probably, disturb the Greeks, who did not care for exact symmetry; but, looking from the court of the Erectheum, which was open to every one, the misfit of the portico must have been painfully obvious.

THE University of Pennsylvania has come into possession of the first instalment of a collection of Babylonian inscribed tablets which promises to surpass in interest the famous collection of cones belonging to the British Museum. It seems that Professor Hilprecht, of the University, who has been making excavations at Nippur, in the Euphrates Valley, has come upon what seems to be a library, or storehouse of records, connected with the temple of the Sun in that city. These records are written on tablets, presumably made of soft clay, and burned, after being inscribed, like the cones used elsewhere in Babylonia; and Professor Hilprecht estimates that one hundred and fifty thousand of them are buried in the ruins of the temple. The tablets appear to date from the thirtieth to the fiftieth century before the Christian era, so that some of them, at least, must have been written long before Abraham was called from Ur of the Chaldees to the land of Canaan. In the case of the inscribed cones of the British Museum, nearly all the inscriptions so far deciphered are simply records of the transfer of real or personal estate, answering to our registries of deeds and mortgages, except that the Babylonians made records of transactions more trifling than those which usually appear in our registry-books; but the Hilprecht tablets may prove to contain matter much more interesting.

THE United States Bureau of Forestry is making rapid progress in systematizing the work which it has undertaken in response to the demand from citizens and municipalities for expert assistance. The former Section of Tree Planting has now been transformed into the Division of Forest Extension, and includes in its province the study of methods for encouraging the natural spread of forests. In certain portions of the West the timbered tracts, which occur mainly on the borders of the rivers, have extended two miles up the course of the stream within the past twenty-five years, and it is believed that a great deal can be accomplished by encouraging this natural forest extension. In the same way, forest tracts now sparsely covered with timber may, it is thought, be made more dense simply by preparing the barren soil between the trees for the germination and growth of the seeds which naturally fall upon it. Meanwhile, the interest of the public in the subject seems to have been thoroughly aroused, and the Bureau is busily employed in giving advice and assistance to people who wish to improve lands now barren. Among others, municipal Water Boards now show great interest in planting trees over the water-shed of their reservoirs. The Metropolitan Water Board of Massachusetts has already planted one hundred and seventy-five acres of new forest, and has young trees in readiness for planting a large additional tract this autumn. The Water Department of the city of Woonsocket, R. I., is also about to plant the territory under its control in the same way. As has been already noticed, several railroad companies have undertaken tree-planting on a great scale, and some of the Western colleges are setting a good example to the farmers of the neighborhood, as well as to their students, by experiments in forestry on their grounds.

ONE of the most interesting of modern engineering events is the definite opening of the electric railway from Le Fayet, or St. Gervais, to Chamonix. It is not long since Chamonix, although one of the most frequented spots in the High Alps, could be reached, except by pedestrians, only by a diligence journey of some fifty-seven miles from Geneva, or by carriage from Martigny or Vernayaz, over the picturesque but rather terrifying pass of the Tête Noire. Five or six years ago, the Paris-Lyons-Mediterranean Railway opened a line from Geneva, over the Chamonix road, as far as Le Fayet, the station for the Baths of St. Gervais. It will be remembered that a glacier torrent carried away, in the middle of summer, a portion of the great hotel of the baths, with its inmates, a few years ago, and a recurrence of the catastrophe was guarded against by the curious device of driving a tunnel, partly through the rock and partly through the ice, to draw off the glacier water harmlessly. From Le Fayet to Chamonix is only twelve and one-half miles, but the grades are so steep that it was impracticable to continue the railroad any farther, and omnibuses were provided by the Company to carry passengers the rest of the way. Now, the omnibuses have been superseded by the trains of an electric railway, which lands passengers at the lower end of the one busy little street of Chamonix, beside the path followed by parties ascending the Mont Blanc. So far as tourists are concerned, the two railways afford, perhaps, an agreeable change from the long and dusty diligence journey from Geneva, but those who have tried to find hotel accommodation in Chamonix during the busy season will understand that great changes must take place in the picturesque little town to provide for the increased travel. It is said that the electric road is to be extended through the valley to Argentière, and perhaps beyond, and this would do much to relieve Chamonix.

THE Prize of Rome in architecture of the Paris School of Fine Arts has been awarded to M. Prost, pupil of M. Lambert. M. Chifflot, pupil of MM. Daumet, Girault and Esquié, is First Second Grand Prize, and M. Coutan, pupil of M. Pascal, the Second Second Grand Prize. The programme called for a design for a National Printing Establishment, containing museums for specimens of books, printing-presses and so on; salesrooms for public documents and books on fine-art, which, it will be remembered, are usually published in France with Government assistance; a residence for the Director, with stables, state apartments and other dispositions suitable to an official of high rank; dwellings for the subordinate officials; and store-rooms, printing-rooms, binderies and other adjuncts of the manufacture of books.

DOMESTIC ARCHITECTURE IN ENGLAND DURING THE MIDDLE AGES.[1]—IX.

RECAPITULATION.

TO shortly recapitulate, on lines set out by Prof. Roger Smith, we may sum up the periods and characteristics marking the birth, development and decadence of mediæval architecture in England as follows: —

Romanesque and *Norman* prevailed during the eleventh and twelfth centuries, as previously illustrated and described at length in *American Architect*, No. 1328, page 76.

Characteristics: — Arches invariably semicircular. *Piers*, low, round and massive. *Windows*, very narrow and widely splayed internally only, as loop-holes for defence. *Doorways*, deeply recessed, becoming more and more enriched as the period advanced. *General construction*, essentially massive and wasteful of material, being hurriedly built for immediate defence against hostile surroundings.

Buttresses were broad, but of small and uniform projection. *Roofs* were low in pitch, covered with lead and used as a "fighting deck" for purposes of defence. Later in the period we find the *mouldings* enriched with the chevron or zigzag, the billet, chain, lozenge and nailhead; the capitals of the columns were decorated with incised ornamentation, made up of curved interlacing bands developed on a cushion-shaped bell; these enrichments are distinctive of the style and period, and entirely disappear on the advent of the pointed arch, they are never found on buildings erected subsequent to the close of the twelfth century.

Early English, or *First Pointed*, obtained during the thirteenth century, as previously illustrated and described at length in No. 1361, page 28.

Characteristics: — Arches, acutely pointed, lancet in form. *Piers*, slender in form, made up of clustered shafts, bound together by zones. *Windows*, broadly splayed internally, as before, but also splayed, slightly, externally; later in the period these single lights were grouped together in pairs under one arch, the pier between them being in still later cases reduced to a mullion (the inception of the Gothic window) and the overhead space filled-in with one stone, pierced with small circles (the inception of Gothic tracery), in which form it was called plate tracery. *Doorways*, deeply recessed, elaborately moulded, the dog-tooth and other conventional carving entirely replacing the decorations of the Norman period. In the capitals of the columns, a clear concave bell replaced the convex cushion, and was decorated by freely relieved conventional foliage of most distinctive character entirely replacing the incised decoration of the Norman period.

The *buttresses*, that before were plain, increased in projection by steps and stages and became prominent features. Gablets, carved finials and crockets appear as altogether new features. Flat wall-surfaces, as in spandrels, become decorated with relieved diaper patterns. *Roofs* gradually increase in pitch to the full equilateral triangle, the crenellated parapet forming the leading element of defensive architecture.

Decorated Geometric, or *Second Pointed*, flourished during the fourteenth century, as fully illustrated and described in No. 1364, page 52.

Characteristics: — Arches, equilateral in form. *Piers*, light, graceful and moulded, showing a general and marked advance in the art of constructive masonry. *Windows*, large, divided up into several lights by moulded mullions. These were continued up into the heads in geometric patterns, forming true (or bar) tracery of wonderful beauty. *Doorways*, enriched with figure-sculpture and carvings of natural forms and foliage, fully relieved, the distinctive conventional "ball-flower" replacing the earlier "dog-tooth" decoration in the hollow mouldings. In the capitals of the columns we find natural reproductions of the ivy, oak, maple and the forms of birds of wonderful sharpness that cannot be excelled at the present time.

Buttresses increase in importance, as leading features, as the walls become less massive in construction and the thrusts from contiguous arches become more concentrated. They increase in projection by numerous offsets, and stand aloft as counterforts decorated with canopies and figures, gablets, finials, crockets, more or less elaborately moulded and carved.

Roofs became of less pitch than in the previous period and they are often open to the framing and are panelled and moulded and decorated with carvings.

The pointed pointedness of the first Gothic, that replaced the round roundness of the Norman, became noticeably moderated in acuteness and more refined and cultured in all its details.

Perpendicular, or *Third Pointed*, flourished during the fifteenth century, as described and fully illustrated in No. 1369, page 91.

Characteristics: — Arches, becoming more depressed or obtuse, always less than equilateral. *Piers*, lozenge-shaped on plan, moulded and panelled. *Windows*, greatly increased in size and much subdivided, the main mullions richly moulded, carried up perpendicularly through the head, also divided in the height by transoms, forming several stories of lights, filled-in with richly colored glass in leaded lights in heraldic devices. *Doorways*, richly moulded, the outside mouldings carried up and returned over the head, enclosing spandrels decorated with cuspated panelling charged with crowns, roses, shields and armorial bearings.

Panelling, as a salient feature, is found as a surface decoration or enrichment, more or less elaborated, wherever it can be introduced. Fan-tracery in vault-groining, though not found in ordinary domestic work, is seen in the cloisters, the private chapels and chantries of the period, and is one of the special and most characteristic glories of the age.

Buttresses become excessively prominent, being bold in projection and carried high up as counterforts finished with dome-shaped turrets highly ornamented with panelling, carved crockets and finials, and decorated with fully relieved crowns, portcullis and armorial devices.

Open-timber *roofs* of moderate pitch and of the characteristic hammer-beam construction appear for the first time towards the close of the period, the timbers moulded and carved and the spandrels filled-in with open panelling, the roof-trusses carried on carved-stone corbels low down in the walls.

The *Tudor* style of architecture obtained during the sixteenth century under the princes of the Tudor line, as fully illustrated and described in No. 1374.

Characteristics: —Arches, four centred, and, in the latter part of the period, three centred or semi-elliptical. *Windows*, wide, still divided by numerous mullions and transoms, the traceried heads, the glory of the past, finally disappearing in the square-headed light, or lintel.

Doorways, moulded and outlined as before, plainer and less pretentious, the Tudor rose, the portcullis and fleur-de-lis being the most common forms of ornamentation. The general features in panelling, buttresses and roof-construction remained, but the richness of detail gradually disappeared and the simple architectural treatment of mediæval forms and styles gradually faded away into rapid incongruity and coarse, meaningless vulgarity. By the close of the sixteenth century all trace of mediæval art, as a living style of architecture, had ceased to exist; and, as the Classic styles of the Augustine period expired in the Dark Ages before the birth of mediæval art, so the latter disappeared in the political and social chaos that succeeded the great revival of letters of the sixteenth century. *Tempora mutantur, et nos mutamur in illis!*

THOS. C. SORBY.

[The end.]

[1] Continued from No. 1378, page 60.

"FIREPROOF WOOD," SO-CALLED.

FROM time to time during the last year several questions have been put to the undersigned and to Professor Norton in regard to fire-resistant materials on which our practice in dealing with slow-burning or mill-construction had given us no experience. From these questions originated the plan for the work in Insurance Engineering now in progress.

Among these questions were two upon which we now report.

The undersigned was asked, as President of the Boston Manufacturers Mutual Fire Insurance Co., what fire-resistant material would best serve for shelving a library. Professor Norton was consulted on the best method of constructing a fire-resistant and sound-proof partition for the separation of many rooms upon one floor, in each of which there might be constant practice in music, both vocal and instrumental, without such passing of sound as to be an annoyance or interruption. These two problems have been made the first subjects of investigation in Insurance Engineering.

Upon the question of shelving, which also covers door and window frames, dadoes, mopboards and other interior finish, much remains to be done. As yet our report must relate more to what is not fit to be used in a building which is otherwise constructed of incombustible material than of what is suitable and safe. On the negative side the evidence is conclusive that wood, whether treated chemically and called fireproof, whether painted with what are called fireproof paints, and unless covered with fire-resistant materials of considerable thickness, is unfit to be used for interior finish in buildings which are otherwise of incombustible materials.

We do not say fireproof buildings because the chief danger of destruction or great injury by fire comes from the burning of the contents of buildings of every type permitted under city building-ordinances, and not from the combustion of the material of the building itself.

Some of the so-called fireproof wood is less liable to rapid ignition and spread of fire from the immediate contact of flame than wood which has not been chemically treated. Wood which has not been chemically treated may also be in some measure protected from quick ignition and the rapid spread of fire by the so-called fireproof paints or, in warehouses for storage, by good whitewash or kalsomine. Wood or plastering of any kind, treated or untreated, when covered with any of the common varnishes, becomes a medium for the very rapid spread of fire originating from the smallest cause.

In dealing with shelving for libraries or museums, the new material known as uralite, not yet attainable, promises to be the most suitable and absolutely safe material at low cost yet known. It is hoped that large works corresponding to those now supplying Russia, where it was invented, and England, where a large supply is taken up for home use, will soon be established in this country.

The next feasible alternative seemed to be what is called "electric fireproof wood" or simply "fireproof wood." The undersigned had little confidence in the chemical processes to which wood is subjected in making it slightly fire-resistant or not quickly flammable, the treatment being old and well-known and, when revived under the name "electric," subject to greater suspicion, because electricity is not used in the treatment in this country. There is a process, of which we have information, now being applied in Germany in which an electric current is said to be applied for this purpose and of which we are promised samples.

In order, however, to remove all doubt, especially since these woods had been used in war-vessels and had been authorized under the somewhat stringent building-ordinances of the city of New York, it was decided to make the tests now reported.

A request was sent by the undersigned, as President of the Boston Manufacturers Mutual Fire Insurance Co., to the following six companies making so-called fireproof wood to supply shelves suitable for a library or museum of different kinds of wood: The Fireproofine Manufacturing Co., New York; American Wood Fireproof Co., Ltd., New York; New York Fireproof Wood Co., New York; The Electric Fireproofing Co., New York; Standard Wood Fireproofing & Chemical Co., Philadelphia; The Ignifuge Co. of America, New York.

Three companies complied with the request, namely: The Electric Fireproofing Co., New York; The Fireproofine Manufacturing Co., New York; Standard Wood Fireproofing & Chemical Co., Philadelphia.

Efforts have been made to induce the officers or agents to be present at the tests and to witness their impartial quality. This request was only complied with by one company.

Other experts in matters of insurance have been present and we have taken the opportunity to subject some other fire-resistant materials, which may be used for inside finish to the same tests at the same time.

We have been obliged to use rather small pieces in our present tests. As soon as we get the buildings up for the Experiment Station, a room of sufficient size within the walls of a concrete building will be placed at the disposal of the makers of fire-resistant material, where full-sized finish may be exposed to direct ignition from the contact of burning material; or, what is of much greater importance, to the high temperatures almost instantly generated from the combustible contents of mills, works and warehouses. The heat thus generated rises to the melting point of the fusible solder of the automatic sprinkler, 160 degrees Fahr., in 30 to 60 seconds; to the igniting point of fibres and untreated wood, 600 to 1,000 degrees Fahr., in two or three minutes; and often reaches the melting point of cast-iron, about 2,300 degrees Fahr., before the fire is extinguished.

Proofs of this report will be submitted to each of the three companies who have supplied the materials tested before going to press, in order to give them the opportunity to make any further suggestions that may be suitable, a final test after such submission being appointed for August 1, at 10 A. M., in No. 2½ Walker Building, Massachusetts Institute of Technology, at which final tests all the makers of so-called fireproof wood will be asked to be present in person or by attorney.

A doubt having been expressed by one of the principal promoters of the use of so-called fireproof wood, in regard to what he called our "theoretic methods" of dealing with the subject, he also stating that it was too late to question the "absolutely incombustible" quality of this product, as he had certificates to that effect from men of the highest scientific authority, I thought it best to make a practical test on my own behalf.

I therefore sent to my country house, where I have a large open fireplace, nearly half a bushel of blocks, split wood and shavings of all the types of fireproof wood yet submitted for testing, including black-walnut, poplar, pine and cherry wood. I first put upon the open grate a quantity of newspapers bunched up, in the hope of getting sufficient circulation to make newspaper burn. Upon this foundation we placed the fireproof material in the form of a cone, the preparation beginning at 8 P. M. We lighted the newspaper with a match, but found that the weight of the wood had crushed it together so that we could not get any good flame from the paper, the wood not being ignited. We then shoved more newspaper under the grate and used the bellows to keep the paper on fire, in which we succeeded, although it took some time. At 8.30 the fireproof wood was well ignited, showing a small flame of greenish-orange tint, from the distillation of the chemicals. At 8.45 the flames, first greenish and orange and then yellow, were from twelve to eighteen inches high, with a bed of hot coals underlying the flame. At 9 o'clock the flame had diminished. The mass constituted a very hot, glowing bed, burning more like coal than wood, with a little flame of the greenish tint upon the top, derived from small pieces which had fallen off at the beginning and had been placed upon the bed of coals. At 9 o'clock the mass was a bed of glowing material bearing no appearance to wood in the body of the fuel — much more like a hot coal fire. This form of combustion lasted until 9.30 P. M., when there was a small bed left about the size of the top of a hat. After that no further notes were taken. In the morning there was perhaps a pint or a little more of charcoal left upon the grate.

The theory of absolute freedom from combustion does not appear to be sustained by this practical test.

My own conclusion, from my observation of Professor Norton's work and the foregoing tests, is that the term "*fireproof*," applied to chemically treated wood, is a misnomer, tending to mislead persons not well informed upon the subject. The claim that any such wood is "absolutely incombustible" is without any warrant in fact. The chemical treatment works in some measure as a fire-retardent. The wood is less flammable from any direct contact with small quantities of burning material. Even if the heat from the burning of other substances partially ignites it, the fire goes out when the outside cause is withdrawn. On the other hand, if the so-called fireproof wooden finish of a building otherwise incombustible is exposed to a high temperature from the combustion of the contents of any room in the building, the chemicals will be speedily distilled; the so-called fireproof wood then becomes ignited and will continue to burn or the fire will go out substantially according to the kind of wood that has been treated. Many kinds of untreated wood, especially whitewood and other types of poplar, are difficult to keep on fire in their natural condition. The time and intensity of the continued burning in the case of both treated and untreated wood depends upon the kind of wood of which the finish is made and upon the draughts of air to which the burning material may be exposed. If any wood of any kind, treated or untreated, is used for the interior finish of a building otherwise of incombustible material, in the judgment of the undersigned, such wood should be encased in thin metal.

This conclusion is stated without consultation with Professor Norton on this point; he will give his own conclusions in his report without consultation with the undersigned.

During the progress of this investigation several materials have been brought to our attention which either are now made and offered for interior finish or soon will be. Preliminary tests of these materials will be made at the final test of the so-called fireproof wood, on August 1, which will be duly reported when the report of that final test is concluded. Respectfully submitted,

EDWARD ATKINSON, *Director.*

BOSTON, MASS., July 24, 1902.

SUPPLEMENTARY REPORT.

Copies of the foregoing report of July 24 and of Professor Norton's preliminary report of July 24 were sent by registered mail in proof-sheets subject to correction, to the representatives of the six companies named therein, with a request that they should make any suggestion, bring in new samples and be represented at the final tests, August 1, at 10 o'clock A. M.

In accordance with this notice, these tests were made and were witnessed by representatives of the Fireproofine Manufacturing Company, American Wood Fireproofing Company and the Ignifuge Company.

The following supplementary report is made, no reason having been given to change any part of the preliminary report made by the undersigned or by Professor Norton.

It should be stated that the only claim made, that the chemically treated wood is "absolutely incombustible," has been made in writing by only one company. The other makers of so-called fireproof wood do not claim absolute incombustibility, but only claim that their treatment makes the wood a fire-retardent.

Among others present were the following gentlemen: F. C. Schmitz, *General Manager*, the Fireproofine Mfg. Co., 66 Beaver St., New York, N. Y.; A. Eugene Kirby, *Secretary*, American Wood Fireproofine Co., Ltd. 156 Fifth Ave., New York, N. Y.; J. B. Peters, *President*, Ignifuge Co. of America, Holland House, New York, N. Y.; Perez M. Stewart, *Supt. of Buildings*, 220 Fourth Ave., New York, N. Y.; Rudolph P. Miller, *Chief Engineer*, Bureau of Buildings, New York, N. Y.; John Leo Jordan, *Ass't Supt. of Buildings*, 220 Fourth Ave., New York, N. Y.; Prof. Ira H. Woolson, Columbia University, New York, N. Y.; John S. Damrell, *Building Commissioner*, 14 Old Court House, Boston, Mass.; Greeley S. Curtis, Boston Fire Department, Boston, Mass.; Henry V. Thayer, *Inspector*, Boston Board of Fire Underwriters, 55 Kilby St., Boston, Mass.; C. J. H. Woodbury, 125 Milk St., Boston, Mass.; Franklin Webster, *Editor*, *Insurance Engineering*, 120 Liberty St., New York, N. Y.; Harry D. Cue, *Editor*, *Insurance Engineering*, 120 Liberty St., New York, N. Y.

All persons present were requested to take any exception to the methods employed, to suggest any other methods and to aid us in making this a final and conclusive trial on the merits of the wood. There was nothing developed which has led me to change any part of my own report previously given, or my own conclusions.

I should add that the fire-hazard of a steel-frame and concrete building is due to the high temperatures generated in the combustion of the contents of such buildings rather than in the flames which may be developed. It therefore follows that the greatest safety will be secured by not adding any combustible material in the construction of the building to the contents which are to be put into that building during its use. Therefore, while I might not, if asked as an underwriter, refuse to insure buildings finished with so-called fireproof wood at a suitable rate of premium, yet, if asked by the assured for advice in their construction, as we are asked by the prospective members of the Factory Mutual Insurance Companies how to construct their works and how to protect them, I should say that the building would be distinctly safer if no wood, treated or untreated, were used in the flooring or in the finish, or even in the doors.

We should, then, name several methods of covering the floors with incombustible material. We should, then, name several substitutes for wood, some of which can be moulded and made decorative for the interior finish of windows, doors, mopboards, etc. We should also name methods of making doors of a decorative kind which would be fire-resistant.

Time did not suffice to make even a preliminary test of several of these substitutes for wood which we have in hand. A complete test will hereafter be made of substitutes for wood for interior finish, of substitutes for boards or tiles for flooring, of fire-resistant doors moulded and decorated, of materials for shelving which will neither burn nor convey heat through their substance, and of outside applications for the treatment of wooden surfaces of various kinds. On all these subjects a separate report will soon be made.

There is also reason to believe that if some of these chemically treated woods, perhaps all, are exposed to a warm, humid atmosphere mould quickly gathers on the back of the finish, between it and the wall. This fungus may gradually destroy the cohesion of the wood and may be also of a very corrosive nature in respect to iron and steel. Tests will be made to determine these points which will require lapse of time for their development. Enough is known to warrant the caution not to permit any kind of a chemically treated wood to be placed in direct contact with any part of the steel-framing of a building.[1] The corrosive effect upon the carpenters' tools used in these tests bears witness to this danger.

In the body of this report I have suggested that if any wood is used for the interior finish of a steel-frame or concrete building, it should be encased in metal. I withdraw that suggestion in respect to the chemically treated wood, lest fungus or mould should be increased by the exclusion of the air. If wood in its natural condition is encased in metal it should be thoroughly seasoned, so that no ferment or dry rot, so-called, may occur. For a finish upon a wall the metal should be carried over the face, around the edges and ends and part way over the back of the finish.

The theory of the fire-door made of wood encased in tin which has long served as a fire-resistant in factory practice is, that while the wood may be slowly carbonized by the heat which passes through the metal, yet the exclusion of the oxygen prevents ignition and renders the door a heat-retardent so long as even the charcoal maintains its position, charcoal itself being a heat-retardent until ignited.

One architect in the city of New York has objected to the protection of wooden finish with a covering of thin metal, on the ground that, in case of a hot fire in the contents of such building, the metal would melt. The thin metal customarily used is a sheet of steel coated with tin, commonly called tin-plate. Any heat that would melt steel would consume unprotected wood in a few seconds, whether treated or untreated, and would wreck any steel-framed building protected by any covering yet devised.

Another architect objects to the wooden door encased in tin, on the ground that it will warp and curl, showing a strange lack of information in regard to common practice in factory construction and protection. The wooden door encased in tin has been adopted in order to overcome the danger of iron fire-doors, which almost invariably warp and curl. The wooden door encased in tin has invariably served its purpose in holding fire from passing from one room or one building to another until the fire-department could get the control of the fire in the building in which it has originated. The automatic fire-door of this description, first invented by the undersigned and since very much improved, is well known to all architects who have given attention to the prevention of loss by fire in factories and workshops.

EDWARD ATKINSON, *Director.*

BOSTON, MASS., August 6, 1902.

REPORT OF PROF. CHARLES L. NORTON.

The processes of "fireproofing" wood by saturating it with a solution which, on drying, leaves the pores more or less filled with crystals which, when heated, give out gases which retard the combustion of the wood, are not new. But the recent discussion as to the real value of such wood in modern buildings in case of fire, and as to the possibility of suitably sampling and testing the product before installing, has led to a series of experiments and examinations which it is proposed to report here. If "fireproof wood" were in any sense fireproof, this discussion would be unnecessary. It is not. It is similar to untreated wood except in three particulars: it is slightly less liable to be ignited by a brief and feeble application of heat; it is less likely to be ignited permanently by contact with a hot body, as an electric wire or a fragment of a projectile; and, further, it is not so likely to cause so rapid a spread of a fire in some cases, as it burns with less flame. "Fireproof wood" is almost identical with untreated wood in the following particulars: It smokes at about the same temperature. It can be ignited at about the same temperature. It will continue to burn in many cases. It is a good fuel. It makes a very hot fire.

The table of temperatures is given below: —

Kind of Wood.	Treatment.	Ignites at	Average.
1. Pine.....	None.	435° C. = 815° F.	
2. Whitewood.	None.	440° C. = 825° F.	
16. Cherry.....	None.	485° C. = 905° F.	840° F.
18. Maple.....	None.	440° C. = 825° F.	
19. Ash	None.	440° C. = 825° F.	
25. Pine.....	Electric Co.	505° C. = 940° F.	
3a. Cherry.....	Electric Co.	505° C. = 940° F.	940° F.
3. Maple.....	Electric Co.	505° C. = 940° F.	
4 and 4A. Whitewood.	Electric Co.	510° C. = 950° F.	
6. Pine.. ...	Fireproofine Co.	500° C. = 930° F.	
5. Whitewood.	Fireproofine Co.	500° C. = 930° F.	930° F.
8. Ash	Standard Co.	470° C. = 880° F.	
7. Cherry.....	Standard Co.	440° C. = 825° F.	
10. Maple... ...	Standard Co.	450° C. = 840° F.	850° F.
15. Whitewood.	Standard Co.	455° C. = 850° F.	

When exposed to a blast of hot gases, the amount of the treated and untreated wood consumed is about the same.

The wood examined was furnished by Mr. Edward Atkinson, as indicated by him in the earlier part of this report. Since these three kinds are apparently possessed of essentially the same characteristic, it will be assumed that they are representative of "fireproof wood," but the writer will be only too glad to limit his statements if he finds that any of the manufacturers who have failed to send us samples have an essentially superior article.

Examination was first made to see to how much higher temperatures the treated wood could be exposed than the untreated without its igniting or beginning to glow.

It will be seen that the average ignition temperature of the six untreated woods in 840 degrees Fahr., while that of the four Electric Company's woods is 940 degrees Fahr., while the Standard Company's six samples average 850 degrees Fahr., and the Fireproofine Company's two samples 930 degrees Fahr.

The value of the treatment is, then, to raise the igniting point less than 100 degrees Fahr., while some of the treated specimens show no sensible improvement. The data were derived from pieces $\frac{1}{4}'' \times \frac{1}{4}'' \times \frac{1}{2}''$, heated at different rates in a small electrical muffle, and the agreement between different samples was within 20 degrees. Twenty samples of each wood were tested and the results averaged.

It cannot, in view of these results, be claimed that the treated wood is sensibly less likely to be ignited when a temperature of 1,000 degrees Fahr. is reached.

The temperature at which the treated and untreated wood "flash," or flame instantly, was ascertained by putting a brass plate $\frac{1}{4}$ inch into the electric muffle and raising the temperature at a rate of about 5 degrees a minute until it was found that a piece $\frac{3}{4}'' \times \frac{3}{4}'' \times 2''$ burst immediately into flame on being thrown on to the brass plate. The flash-points are given in the accompanying table: —

Specimen.	Treatment.	Flashes in Muffle at Degrees Fahr.
1. Pine.....	None.	975°
2. Whitewood..	None.	950°
3. Maple.....	Electric Co.	1,140°
3A. Cherry.....	Electric Co.	1,140°
4. Whitewood..	Electric Co.	1,130°
4A. Whitewood..	Electric Co.	1,130°
5. Whitewood..	Fireproofine Co.	950°
6. Pine.....	Fireproofine Co.	960°
7. Cherry.	Standard Co.	1,015°
8. Ash.....	Standard Co.	1,015°
10. Maple..	Standard Co.	1,015°
15. Whitewood..	Standard Co.	1,015°

It should be borne in mind that any of the glowing wood may be fanned into blaze by a suitable draught or the burning of adjacent pieces.

The smoking temperature is not of material importance, but serves to indicate the similarity of behavior of the treated and untreated wood at low temperatures. The smoke, when mixed with air, is explosive, just as is the smoke from untreated wood. Further, the smoke and gases from the treated and untreated wood are alike liable to be ignited by a flame or spark, and cause the wood to be ignited when the wood itself is not yet heated to the ignition-point. The treated wood is less liable to this action, though I have seen it happen a number of times.

The extent of the relative destruction of the treated and untreated wood on exposure to the action of a flame at varying temperatures was carefully studied, with the results that are given below. They show that, with a blast of gas at a temperature of from 1,700 degrees Fahr. to 3,000 degrees Fahr. for 1, 2 and 3 minutes, the loss of a cross-section of a small specimen is from 5 to 12 per cent greater in the case of an untreated wood than in the case of the treated wood.

The table given below shows the diminution in cross-section in 3 minutes of several specimens $\frac{3}{4}'' \times \frac{3}{4}'' \times 6''$ when exposed to the flame of a blast-lamp.

Specimen.	Treatment.	Percentage Area burned.	Average.
Pine.....	Untreated.	64	
Whitewood....	Untreated.	62	
Cherry	Untreated.	48	
Maple.....	Untreated.	64	60
Black Walnut.	Untreated.	71	
Ash	Untreated.	54	
Cherry	Electric Co.	41	
Maple.	Electric Co.	45	
Whitewood....	Electric Co.	54	48
Pine.....	Electric Co.		
Pine.....	Fireproofine Co.	49	
Whitewood....	Fireproofine Co.	64	56
Cherry.....	Standard Co.	58	
Ash.....	Standard Co.	62	
Maple.....	Standard Co.	62	51
Whitewood....	Standard Co.	42	

If exposed to a hotter flame or for a longer time, the untreated wood more nearly approaches the treated wood in the amount of unburned area.

When subjected to the action of a powerful flame from a blast-lamp, the *rapidity* of destruction of a small test-piece also serves as an index of the value of the fireproofing as a preventive of combustion. Specimens $\frac{3}{4}'' \times \frac{3}{4}'' \times 6''$ and $\frac{3}{4}'' \times \frac{3}{4}'' \times 12''$ were supported in a horizontal position by the ends and a large blast-lamp placed under the centre. The time elapsing before the stick burned and fell apart was noted. There is no great difference between the treated and the untreated wood in this particular, the table below giving the average time required for a number of the specimens to burn through. It was noticeable that all the untreated specimens furnished more flame than the treated.

[1] A partial test not yet complete shows the tendency to mould in a very positive manner. (August 16.)

Specimens.	Treatment.	Average Time for Specimen to burn through.
Pine..	Electric Co.	6 minutes 35 seconds.
Whitewood.	Electric Co.	
Cherry.....	Electric Co.	
Maple.....	Electric Co.	
Ash	Standard Co.	6 minutes 18 seconds.
Maple.....	Standard Co.	
Cherry.....	Standard Co	
Whitewood.	Standard Co.	
Pine.....	Fireproofine Co.	6 minutes 22 seconds.
Whitewood.	Fireproofine Co.	
Pine.....	Untreated.	5 minutes 52 seconds.
Whitewood.	Untreated.	
Ash	Untreated.	
Cherry.. ...	Untreated.	
Maple.....	Untreated.	

The variation between individual specimens is very large, and the data on length of time required by a specimen to burn apart is only of value in showing again the similarity of condition of the treated and untreated wood.

The "hot-plate" test was next tried and showed clearly the characteristic tendency of the treated woods, when in isolated pieces, to char without much flame and to extinguish themselves when taken from the plate. The glow and flame last only a few seconds in the case of any of the treated woods, while they may last from 1½ to 2 minutes or may last only a few seconds in the case of untreated woods. This test demonstrates the value of fireproof wood as a safeguard against ignition from electric-wires in a certain sense, yet no "hot-plate" can compare in intensity with the incandescent metal and metallic vapor of many a short circuit. It is a good demonstration of the added safety of warships when finished with "fireproof" rather than natural wood, since one great danger of ignition in war-vessels is, I believe, from hot fragments of metal. In its general application to buildings this test demonstrates very little.

The tests which appeal most strongly to the writer are those which follow, and they are those which any architect may make for himself and judge for himself. These tests were made with the wood from each manufacturer separately. A furnace made of a half-dozen bricks and a 6-inch square of wire lath serves to hold a double handful of "fireproof" kindling. A piece 2 inches long sawed off the end of a board and then cut into pieces varying from ⅛ inch to ¼ inch square answers admirably for the fine kindling, being better than shavings. Add further a second double handful of little blocks ⅞″ x 1″ x 2″ or thereabouts. Apply beneath the grate a crumpled-up newspaper and a lighted match, and add rolled-up balls of newspaper as the first ones burn out, for a minute or so. The so-called fireproof wood will be harder to light than untreated wood; but, when lighted, you will make a good, lasting fire. In such a furnace, using treated wood for fuel, I have melted up several pounds of lead in a ladle and have then added larger blocks of the wood, ⅞″ x 2″ x 6″, and burned them up. As a final experiment, I have lighted such a furnace without any newspapers for kindling, but by the successive applications of some half-dozen matches. The fire, like any other, lights more readily and burns better if it is provided with a draught by means of a chimney, which may well be made of a length of tile-pipe.

One of my assistants, an excellent mechanic, substituted a bundle of about twenty sticks, ⅞″ x ⅞″ x 12″, in the kindling to be used by his wife in lighting the fire with which to prepare their breakfast. Although the major part of her kindling was "fireproof," the unsuspecting housewife made no comment, but made the fire as usual and burned up all the wood.

Noting the comment on the part of the manufacturers who saw my furnace glowing and flaming, that large pieces could not be made to burn, the following experiments were made: In a large fireplace, between two hard, dry pieces of pear-wood, 4 inches in diameter and 12 inches long, there was built a fire of newspaper and "fireproof" kindling; over this were laid on edge four boards (6″ x 24″, 8″ x 30″, 14″ x 20″ and 14″ x 30″) of "fireproof" wood, two from the Electric Company and one each from the Standard and the Fireproofine Company. The fire spread up and along the boards, and in about 2 hours the whole contents of the fireplace, except the pieces of pear-wood, were consumed. The two logs were all afire, but went out after the "fireproof" wood had been consumed. The room, in the meantime, had been rendered unbearably hot by the fire, which resembled a good cannel-coal fire in appearance.

One other experiment was made, to show how misleading is the test made by taking the wood out of the fire and noting how long it glows. A box, or pipe, 3 inches square and 36 inches long, open at the ends, was made of four different kinds of fireproof wood. This was held vertically over a blast-lamp until well afire at the bottom. The lamp was then removed, but the wood continued to burn until the box was much more than half consumed and fell apart, breaking into a half-dozen pieces. No one of the boards would have burned by itself nearly as much as it did when there was other heat near it — a condition, of course, which a fire in a building nearly always provides.

In the light of the results of these experiments, it would not appear that more can be claimed for "fireproof" wood than this: that, when heated, it gives off a gas which makes it more likely to fail to keep burning than an untreated piece of wood; and that, when afire, it gives out less flame, and hence is not as likely to cause fire to spread. It is not incombustible; it is not uninflammable; it is a good fuel; it will, under many conditions, support its own combustion; it is destroyed by external heat nearly as rapidly as is untreated wood. It is not as easy to work at high speed; it may cause rusting (as do some of these specimens), and the mechanical strength of the wood is slightly impaired. While it may be said to be an added safeguard to use this treated wood in tall buildings, it is so slight a safeguard as to be, in my opinion, of questionable value.

It should be borne in mind, too, that these samples, direct from the manufacturers, are of a certain standard of excellence which would hardly be reached in general without most rigid and expensive examination. I can suggest no sure method of examination of the wood furnished for a building which would be satisfactory and yet not inordinately expensive.

In consideration, then, of the physical properties of such wood as has been examined and of the difficulty of assuring one's self of the nature of the product; and further, in view of the possible deterioration of the wood or the fastenings and finish, the use of such fireproof wood in ordinary buildings seems of very doubtful value.

C. L. Norton.

Boston, July 24, 1902.

SUPPLEMENTARY REPORT OF CHARLES L. NORTON.

On August 1 a public test of so-called fireproof wood was held at the Walker Building of the Massachusetts Institute of Technology to demonstrate publicly some of the phenomena described in my previous report.

Specimens ¾″ x ¾″ x 6″ were subjected to the action of gas-flames of different intensities, and the percentage of wood consumed in 2 minutes, as well as the time to burn wholly apart, was noted. Next, a fire of bits of "fireproof wood" was kindled in a furnace made of half a dozen bricks by a lighted newspaper. Wood from the Electric Company, the American Company, the Standard Company and the Fireproofine Company was treated in this way.

The time required for the destruction of a small "cob-house" of treated and untreated wood was next determined. The little houses were built of sticks ¾″ x ¾″ x 6″ laid in nine layers of five pieces each, the adjacent layers being at right angles.

Upon applying a blast-lamp for 5 minutes, the treated house burned without much flame and at the end of 10 minutes, after the withdrawal of the lamps, the house fell. The untreated wood, when lighted in a similar manner, burned with more flame and fell at the end of 5 minutes and 20 seconds, the scattered pieces burning for a longer time than did the fragments of the treated house.

Next, four boxes, or flues, 3″ x 3″ x 28″ inside, without ends, were placed vertically over a blast-lamp until lighted at the lower end. Some half-dozen blocks ¾″ x ¾″ x 6″ were dropped in and held near the hollow of the flue by a wire grate. Three out of the four boxes continued to burn after the lamp was removed until they were burned through in places a foot apart.

A very extensive collection of pieces of "fireproof wood" from buildings now under construction in New York City has been examined in the same way as have the samples already described. They behave in a manner much like the earlier samples, but are slightly more flammable, and they are not as uniform in treatment throughout.

Respectfully submitted,

Charles L. Norton.

Boston, Aug. 8, 1902.

A BRITISH REPORT ON OUR IRON TRADE.

THE phenomenal development of the iron and steel industry of the United States led the British Iron Trade Association to appoint a commission last year to inquire into the industrial conditions and competition of the United States. The report of that commission, which has been recently presented, is briefly reviewed by the *London Commercial Intelligence*, a copy of which has just reached the Treasury Bureau of Statistics. It says: —

"It is, indeed, a marvellous and, to the British manufacturer and trader, in some respects a most discouraging story. The British Iron Trade Commission gives details of the mineral resources of the United States as affecting that fundamental industry — the manufacture of iron and steel; shows the extraordinary richness of the principal fields of coal, iron-ore and kindred minerals and demonstrates by concrete examples how the natural inventiveness of the American has enabled him to apply to the operations of production and distribution a wealth of original ideas and methods that are as yet little known in Europe. It is also made manifest how on land, on lake, on river and on canal, the American people have applied their minds to the solution of the conditions and problems of cheap transport until they have at last attained a level of rates and charges such as we have hardly had any experience of on this side of the Atlantic. It is not, however, to be supposed that the triumphs of the American people in these matters have been achieved without effort. Much testimony is borne to the fact that in the conditions of organization and administration in their dealings with labor, in the confidence and enterprise with which they have embarked on industrial operations of great magnitude, in the efforts made to adapt themselves to new conditions, in the eagerness with which they have endeavored to create new demands both at home and abroad, and in the care and attention given to the successful cultivation of foreign markets, the American people have labored strenuously for many years, until labor, ingenuity and enterprise have become their most distinguishing characteristics. When one has appreciated all that the Americans have done for themselves, it is neither natural nor

reasonable to grudge them the success which has attended their labors."

Commercial Intelligence presents the following picture of the relative growth of the iron and steel industry in the United States and the principal countries of the world: —

PRODUCTION OF PIG-IRON IN THE UNITED STATES, UNITED KINGDOM, GERMANY AND ALL OTHER COUNTRIES, IN GROSS TONS.

Year.	Tons.			
	United States.	United Kingdom.	Germany.	All other Countries.
1865	832,000	4,819,000	760,000	2,839,000
1870	1,668,000	5,964,000	1,369,000	2,902,000
1875	2,024,000	6,365,000	1,997,000	3,510,000
1880	3,835,000	7,749,000	2,686,000	3,201,000
1885	4,045,000	7,415,600	3,629,000	4,439,000
1890	9,203,009	7,904,000	4,585,000	5,738,000
1895	9,446,000	7,703,000	5,379,000	6,376,000
1900	13,789,000	8,960,000	8,386,000	9,265,000
1901	15,878,000[1]	7,750,000	7,737,000[1]	9,042,000

[1] Iron and Steel Association figures.

CHRIST CHURCH CATHEDRAL, OXFORD.

ANTIQUITY, architecture, great traditions, distinguished alumni, and church music form a combination of characteristics which invest with peculiar interest the great College of Christ Church in the University of Oxford, says a writer in the *Musical Times*. In regard to antiquity, a Saxon church which formed part of the monastery of St. Frideswide, *circa* 727, stood on the site of the present Cathedral. Commenced in 1120, and consecrated sixty years afterwards, the buildings forming the Chapel of Christ Church, otherwise the Cathedral of the Diocese of Oxford, are rich in architectural development — the Norman of the main sanctuary, the Early English of the Chapter House, and the Perpendicular of the Refectory, now broken up with rooms, but preserving the exterior windows on one side. Its spire, though appearing somewhat dumpy in this "sweet city of dreaming spires," is one of the earliest — if not actually the first — built in England. The fact that Christ Church is one of the smallest of our cathedrals is partly due to Cardinal Wolsey, who chopped off, so to speak, three of the westernmost bays of the nave in order to make way for the celebrated Tom Quad.

In recent years the Cathedral has been lengthened by a new western bay forming an ante-chapel. The interior has several features of interest. The Lady Chapel and the Latin Chapel — a church within a church — both situated at the northeast of the choir, give the Cathedral a peculiar shape. Moreover, the choir and the nave are not separated. At the east end are three extremely rough arches, leading to three semicircular apses, of which the foundations still exist, discovered in 1888, and which remain as relics of the first stone church of St. Frideswide, one of the earliest stone churches in England. The thirteenth-century shrine of St. Frideswide attracts attention no less by its beauty than for its historical associations. In the choir may be seen traces of Ethelred's work in the large round pillars and the weathered columns above, that once formed part of the clerestory. One of the oldest Members of the House, Mr. T. Vere Bayne, has lately resolved to replace the curious corner turrets of the west end at his own private cost. The pulpit, surmounted by a pelican, and the organ case, are of the Jacobean period.

The reverent restoration of the Cathedral, first instigated in 1856 by Dean Liddell, included the successful rebuilding of the east end, said to be a reproduction of the original twelfth-century design, and is a testimony to the labor of the late Sir Gilbert Scott. As showing the utter lack of reverence in the "good old days," as they are so often misnamed, it may be mentioned that previous to 1870 one bay of the south transept served as the residence of the Dean's verger. This functionary, a Mr. Keys, kept his beer-barrel in a cupboard just below the pew in which the deanery ladies sat! Moreover, Verger Keys used to station himself at the entrance of the choir armed with a stout dog-whip, with which to belabor any of the canine tribe that not infrequently followed their undergraduate masters into chapel. If the chapter-books are not profuse in reference to the Cathedral, they furnish evidence of the rich ornaments that even survived the confiscation (*temp.* Henry VIII) of "monuments tending to idolatrie and popish or devill's service, crosses, censars, and such lyke fylthie stuffe."

One of the earliest chapter-orders enjoins that "the Orgaines in the Quire of this Church be taken downe." Father Smith built an organ of two manuals in the year 1680. The organ has occupied various positions at different times. In 1806 the organ-loft was "fitted up so that the singing boys and singing men may be removed thither for the future." The present organ — located at the west end of the nave, its key-boards approached by an iron spiral staircase — is a four-manual instrument, rebuilt in 1884 by Father Willis. In any scheme of reconstruction, now necessary after the wear and tear of eighteen years, the choir-organ should be restored to its original "in front" position, where it remained for nearly two centuries, in order that its stops may form a better support to the voices than is possible under the present arrangement.

SPANISH ARCHÆOLOGY. — The city of Barcelona offers a prize of $4,000, due in 1906, for the best work on Spanish archæology. It may be written in Latin, Spanish, Italian, French or Portuguese. —*Exchange.*

THE GERMANIC MUSEUM, NUREMBERG.

IN the New York *Evening Post* Kuno Francke says that "For more than twenty years Baron von Aufsess, the virtual founder of the Museum, wrote, labored, begged, and spent his own means for this project without obtaining any help or recognition from any quarter, without meeting with anything but ridicule or indifference, or at best half-hearted and lukewarm interest. And even when at last, in 1852, through the vote of the Historical Congress referred to, the establishment of this Museum, with Aufsess as its director, was decided upon and made a matter of common scholarly concern, the means at the disposal of the young institution were so slender that for years to come it was continually on the brink of disaster, and required constant financial sacrifices on the part of the director to be barely maintained.

"Until 1857, most of its collections were housed in a single tower of the Nuremberg city-wall, the Thiergärtner Thor, and the accommodations for accretions were so ridiculously insufficient that, for instance, when in 1853 the official records of the Frankfort Parliament were presented to the Museum, the twenty-three boxes containing this valuable gift had to be stored in the kitchen of a private house. It is to Aufsess's lasting credit that, in all these straits, difficulties, and disappointments, he never lost heart, always stood by the great ideal of his life, and thus weathered one crisis after another, until at last, through the acquisition of the old Carthusian monastery from the Bavarian Government, a proper housing for the growing collection was obtained, and popular and official interest in the national undertaking permanently secured. That this noble, patriotic man should have met with his death at the hands of a drunken student when, in 1873, he had gone to take part in the festivities attending the foundation of the University of Strassburg, gives to his life a touch of the irony of Fate.

"It was, however, not only the memory of the founder of the Germanic Museum which actuated the festivities of last month. They were also meant as a tribute to what the German people has done for this museum since it was once publicly recognized. It is not an empty phrase when, over the main entrance of the Museum quadrangle, there stands the inscription: 'Eigentum des deutschen Volkes.' Here we tread, indeed, in more than one sense upon national soil. Ever since 1857, when the institution was first housed in a manner suited to its intrinsic importance, it has stood before the public eye as a symbol of German greatness, as an embodiment of the most precious traditions of the German past, and as an appeal for maintaining these traditions in the present. Princes, states, cities, and private individuals have vied with each other in showering gifts of objects as well as of money upon it, the latter ranging from five florins collected by the pupils of a Bavarian seminary — the very first contribution made to the Museum — to the million marks which were given by two Nuremberg citizens a few weeks ago as an anniversary donation. And it would be hard to conceive of a more widely diffused popular interest in a scientific institution than that maintained in this museum by the network of so called *Pflegschaften*, or chapters of the Museum Association, covering all Germany, each of which is constantly disseminating, within its local boundaries, information regarding the needs as well as the most recent acquisitions of the Museum, and is thus stimulating ever new endeavors in its behalf. It is largely owing to this finely systematized popular propaganda that, apart from the running expenses of the Museum administration, which are covered by yearly appropriations from the German Empire, the Bavarian Government, and the city of Nuremberg, all other financial costs, for purchases, building alterations, special investigations, and so forth, are defrayed by voluntary contributions coming from every class of people and from every part of Germany."

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES POST-OFFICE, ROME, N. Y. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

"THE PARKVIEW," CENTRAL PARK WEST, NEW YORK, N. Y. MR. ELLIOTT LYNCH, ARCHITECT, NEW YORK, N. Y.

HOUSE OF WILLIAM POWER WILSON, ESQ., GRANBY ST. AND BAY STATE ROAD, BOSTON, MASS. MR. J. PH. RINN, ARCHITECT, BOSTON, MASS.

[The following named illustration may be found by reference to our advertising pages.]

ST. MARY'S CATHOLIC CHURCH, DUNDEE, SCOTLAND. MR. T. MARTIN CAPPOM, F. R. I. B. A., ARCHITECT, DUNDEE, SCOTLAND.

THIS plate is copied from *Building News*.

[Additional illustrations in the International Edition.]

ENTRANCE: HOUSE OF WILLIAM POWER WILSON, ESQ., GRANBY ST. AND BAY STATE ROAD, BOSTON, MASS. MR. J. PH. RINN, ARCHITECT, BOSTON, MASS.

[NOTICE. — As the other subjects intended for this issue have been spoiled by the printers their appearance must be deferred to a later issue.]

NOTES AND CLIPPINGS

THE BRITISH ACADEMY. — King Edward has granted a charter incorporating the new British Academy for the Promotion of Historical, Philosophical and Philological Studies. The charter names 49 original fellows, including Lord Rosebery, Prime Minister Balfour, Lord Dillon, President of the Society of Antiquaries; Lord Reay, President of the Royal Asiatic Society; James Bryce, William E H. Lecky, John Morley, Sir Frederick Pollock and Leslie Stephen. This, together with the creation of the Order of Merit, is regarded as a striking experiment, and has provoked comparison to the French Academy, which has failed to enroll many of the greatest names in French literature. Members of the British Academy are to be called simply "fellows," instead of "immortals." Both Cambridge and Oxford are represented among the charter members, but a notable omission is Herbert Spencer.— *Exchange.*

AN ICELESS REFRIGERATOR. — An iceless refrigerator has been invented by an Oregon man, in which the principle of the evaporation of water to reduce temperature is used. According to the inventor, the iceless refrigerator presents much the same appearance as do ordinary refrigerators. The outer casing and door may be made of plain or expensive woods, as taste may dictate. The upper half and the top are closed tightly. The lower portion is formed of inclined slats, through which air may be freely admitted. The door is also made tight at the top, and provided with slats at the bottom. The interior frame is made entirely of galvanized iron to prevent shrinking and expanding or becoming mouldy with constant dampness, and it is also a good conductor of heat, and, therefore, assists in reducing the temperature lower than it could otherwise be maintained. Burlap or other fibrous material is fastened upon this inside frame so as to form an interior wall, which stands at a sufficient distance from the outer wall of the structure to form an annular space between the two. In the top of the inner structure is an opening covered with screen material. Through this and the slats around the bottom of the outer casing a constant draught of air passes, thus causing an evaporation of moisture, with which the fibrous material is saturated, so that the interior of the apparatus is maintained at a low temperature. All around the top of this frame is a strip of galvanized iron, with an inclined lip bent over. The edge of the burlap is fastened upon the face of the frame, one-eighth of an inch above the edge of the lip, so that the water which is discharged upon this inclined surface will not flow over the burlap, but will be directed against it, so as to be absorbed, thus saturating the burlap. The fastening for this burlap or other fibrous material consists of a double-pointed tack or holder, the head of which is soldered or otherwise secured to the face of the galvanized iron. The fibrous material being pressed over the points, they are folded down to hold it in place. This renders it easily removable for change or cleaning. Above the top of the frame is a tank for holding water. Projecting from the sides and ends of this tank, and at a suitable distance apart, are horizontal pipes having in the outer ends vertically disposed needle valves, which control the flow of water from openings in the lower parts of the pipes. These openings and controlling valves are situated in line above the slanting lips, so that water delivered from the openings falls upon the lip and flows down into the fibrous material, keeping it constantly saturated. — *N. Y. Evening Post.*

URALITE, A NEW FIREPROOFING MATERIAL. — Uralite, a new fire-resisting material for constructional purposes, originally invented by Colonel Inchenetski, a Russian artillery officer, and since greatly improved by the British Uralite Company, was subjected to somewhat severe tests on Wednesday at the Company's works, near Rochester, Kent. In its manufacture asbestos from Canada, the United States, and the Ural Mountains is ground to pulp, and mixed with about 30 per cent of chalk to fill up the interstices between the short fibres, and, after going through a number of chemical processes, appears in the form of tough, pliable strips. Finally, gelatinous silica is used for cementing purposes, about 20 per cent being required, and this combines with the 30 per cent of chalk, and some 50 per cent of asbestos, in making boards of uralite which are stiff, will stand a great amount of wear and tear, and, above all, are impervious to fire. A deed-box, constructed of wood, and lined with uralite, one soft layer of which separated two layers of wood, while two more layers, one soft and one hard, covered the inside and outside, was placed on iron standards inside an iron-framed hut, covered, and lined with uralite. A fierce fire was kindled, the temperature inside at one time reaching 2,030 degrees Fahr., and after being left over half an hour, an examination was made. It was found that the wood nearest the fire was charred right through, but the middle uralite was sound. The outer layers had porcelained, and were badly cracked. Papers placed inside were slightly discolored, owing to distillization, but were not charred. Sulphur and fusible metal placed within crucibles were unchanged, a portion of paraffine wax in another crucible alone having melted. Another test had for its object the trying of what various pattern doors fitted into a brick hut would stand. A fire was ignited inside, and the doors were closed, and left so, over an hour. The highest temperature at one time was 2,350 degrees Fahr. As a result, one door of two layers of uralite running throughout, and forming the panels, with a framework of timber on either side, was penetrated by flames after some time, which was not surprising, considering its slight structure, and most of the wood was charred off. The uralite, however, stood. Another door of two layers of oak, separated by uralite, with two layers of the same material without and within, proved impenetrable, the inner layer only being cracked and porcelained. This was intended to represent a warehouse door. Two other doors were equally successful, a sheet of tin in one only being slightly buckled. In the case of two sections of platform, one of wood only, and the other of wood cased with uralite, the former was rapidly eaten away by the flames, while the latter was, at the end, quite strong. Subsequently, the various processes were explained, and it was shown that uralite can be painted, and will take a wood veneer, which will not warp or crack, and is about one-fifth of the weight of its own size in corrugated iron. — *Insurance Observer (London).*

ALUMINIUM AS A SUBSTITUTE FOR COPPER. — The possible substitution of aluminium for copper in electrical work is a question which has been discussed from time to time in the press; frequently, we regret to say, by writers who apparently know very little about the facts. It has also been referred to by electricians, some of whom have been able to speak from actual experience. From the expert testimony it appears that aluminium can be and has been used for conducting purposes in power-plants and for the transmission of power from such plants. The most notable employments of the metal for the former purpose have been in some of the recent installations at Niagara and in some California plants; for the latter at Snoqualmie Falls in Washington, and the Blue Lakes power-plant in California. Notes of these uses of the metal have appeared in our columns from time to time; and its use at Blue Lakes was fully treated by Dr. F. A. C. Perrine in a paper read before the Institute of Electrical Engineers. The testimony of experts is that aluminium has given good results where it has been used; and that its lesser conductivity, as compared with copper, and its lower tensile strength, requiring the use of bars and wires of larger section, are so balanced by the low specific gravity of the metal that in the matter of cost aluminium at its present prices is about equal to copper at 16 to 17 cents a pound — that is, at present prices. For transmission wires there still seems to be some doubt whether, in a northern climate, aluminium wires will stand the stresses of snow, ice and high winds as well as copper. In a milder climate this consideration might be disregarded. It may be assumed, therefore, that it would be possible to substitute aluminium for copper in electrical work to a considerable extent — provided the metal can be had in sufficient quantities for the purpose. That is, after all, the most important question. For all immediate purposes the question seems to be answered by the fact that in 1900 the total production of aluminium in the world was 5,570 metric tons, of which the United States furnished 2,053 tons; while that of copper was 492,625 metric tons, of which 272,536 tons were supplied by this country — that is, the total output of aluminium last year was only 1.1 per cent of that of copper. Until these figures are greatly changed, the competition of aluminium is not likely to affect the copper market. The price of aluminium at present is — as above stated — about on a par with that of copper, allowance being made for the respective weights. The aluminium quotations, however, have not been regulated by those of copper, but have been based, as we understand, upon the cost of production. They have shown little change during the past year. There is no competition tending to lower them; but on the other hand it is to the interest of the producers to keep them as low as possible in order to dispose of their output. The main point to be considered, therefore, is to what extent the production can be increased. There is a general indefinite idea prevalent that as alumina is so abundant and so universal in its occurrence, it ought to be possible to extend the extraction of its metallic base indefinitely. That this is not the case is shown sufficiently — without going into details — by the fact that present production is so small, although the best metallurgical skill has been for years concentrated on the problem of separating the metal. We do not mean to say that cheaper and more expeditious processes of furnishing aluminium may not be discovered hereafter. That is a problem which may be worked out by some investigator to the great benefit of the world — and himself. It has not been done yet, and considering present conditions, as we must, we are unable to see any opening for the substitution of aluminium for copper — or for any other metal — on a commercially important scale. — *Engineering and Mining Journal.*

AN UNVERIFIED PREDICTION. — In the *Anti-Jacobin Review* (English) for 1800, may be found the following flouting of the new capital city of this country: "The seat of the Federal Government is this year to be removed into a wood in Maryland, called the city of Washington. From the 'Capitol' of this city, one wing of which is, we are informed, so far finished as to be fit to receive the Congress, the members must go 4 miles to a little place called George Town, to their lodgings! Some people suppose that when the Government retires into this desert, it will, like the Grand Lama, be adored, because it will never be seen; others suppose that the spot will soon be rendered rich and populous by the vast concourse of pilgrims who will, doubtless, flock to the tomb of General Washington, whose body is to be removed thither from Mount Vernon; there are, however, others who, far from having any hopes of this sort, scruple not to aver that if anything would hasten the downfall of this tottering fabric of a government, it certainly would be the ridiculous removal in question."

LANDSEER'S AMBIDEXTERITY. — Mr. Conrad Cooke, son of E. W. Cooke, R. A., tells me that he used to hold the paper while Landseer drew one animal with his right hand and a different animal with his left, writes Mr. J. A. Manson in "*Sir Edwin Landseer, R. A.*" This species of dexterity comes from practice, no doubt, and is akin to the adroit manipulation of the accomplished pianist, but is nevertheless extraordinary, and several cases are recorded in which Sir Edwin fairly astounded the onlookers by such displays of manual skill. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, SEPTEMBER 13, 1902 No. 1394

CONTENTS

SUMMARY: —
The Philadelphia Chapter, A. I. A., compelled to restore Mr. Addison Hutton to Membership. — Associations cannot exceed their Charter Rights. — The Need for a Reduction of the Lumber Tariff. — The Political Aspects of the Anthracite-coal Strike. — The present Condition of the Strike. — L'Art Nouveau. — House-front Advertising. 81
THE AMERICAN VIGNOLA. — IX. 83
THE ORNAMENTAL METALWORK OF P. L. BRINDEAU. 85
ROMAN AND ROMANESQUE FRANCE. — II. 85
COUTURE AND DUTUIT. 86
THE LIGHTNING RESEARCH COMMITTEE. 87
ILLUSTRATIONS: —
Elevations and Section: Central Baptist Church, Wayne, Pa. — Pedestals and Pilasters. — Pediments. — Roman Catholic Church, New York, N. Y.
Pan-American Exposition, Buffalo, N. Y.: The "Fountain of Ceres"; — Graphic Arts Building.
Additional: "The Empire," No. 333 Commonwealth Ave., Boston, Mass. — Entrance to the Same. — The Central Baptist Church, Wayne, Pa. — The Saturday-Club Building, Wayne, Pa. — Entrance to House of Edwin U. Curtis, Esq., Bay State Road, Boston, Mass. — Views in Antibes, France. — "Originality" and l'Art Nouveau. — The New Church of St. Paul, Basel, Switzerland. — Plans and Section of the Same. . . . 87
COMMUNICATION: —
When do Building Operations begin? 88
NOTES AND CLIPPINGS. 88

THE unfortunate controversy, with which our readers are only too familiar, between Mr. Addison Hutton and the Philadelphia Chapter of the American Institute of Architects, has ended in the defeat of the latter, which is commanded by the Pennsylvania Court of Common Pleas to restore Mr. Hutton to membership, and to the privileges which he formerly enjoyed as a member of the Chapter. After the original competition for the State Capitol at Harrisburg, in which the profession was treated with such conspicuous bad faith, and after Mr. Cobb, who had been employed, in violation of the terms of competition, and of the law, had been, in his turn, ignominiously dismissed, a second competition was instituted, confined to Pennsylvania architects, for plans for the completion of the building upon the foundations already put in by Mr. Cobb. The Philadelphia Chapter, the members of which have long been distinguished for their unselfish and intelligent devotion to professional interests, denounced the new competition, by resolution, as "calculated only to encourage favoritism and injustice," and advised all Pennsylvania architects to refrain from entering the contest. Mr. Hutton, a member of the Chapter of long standing, submitted competitive designs, notwithstanding the action of the Chapter, and was, in consequence, expelled from membership. He applied to the Courts for reinstatement, and was successful, the Court holding that the powers of the Chapter were strictly limited by its charter, and that the charter did not provide for the expulsion of members for such offences as that charged against Mr. Hutton.

WE may as well say frankly that we are pleased at the result of the suit; not from any unfriendliness toward the Chapter, for the members of which we fully share the gratitude and esteem generally felt in the profession; but because the fact that a corporate body cannot legally exceed the rights conferred by its charter needs to be brought to the attention of professional associations. Societies of architects are not more free than others from the temptation, in the heat of controversy, or in their zeal for the defence of professional rights, not only to overstep their legal powers, but to pass resolutions, or take measures, which, in cooler moments would appear less justifiable. In the case of Mr. Hutton, the question whether disloyalty to the expressed sentiment of his Society would, in the abstract, justify his expulsion might admit of an interesting argument; but it is certain that it did not legally justify such action; and the same principle will apply to occasional acts of professional societies, which middle-aged architects will remember, in favor of which much less can be said than in this case. So far as Mr. Hutton is concerned, it seems to us that the result of his contest ought to be to reinstate him actually, as well as legally, in his position in the Chapter. It is, indirectly, an honor to the Chapter that he valued his membership in it so highly as to be willing to engage in a costly lawsuit to compel reinstatement; and, while so many causes are mentioned in the Charter for the legal expulsion of a member, the fact that he did not fear the application of any of these to justify the action of the Chapter speaks strongly in favor of his worthiness to be associated with it.

WITHOUT entering into political questions, which are not our province, it may be observed that the reduction or abolition of the duty on lumber, which seems likely to be the first step in any process of tariff remodelling undertaken by either party, will have an important effect upon the building industries everywhere in the Northern States. The New York *Times*, which although opposing high tariff, is usually conservative, mentions its "surprise that the voice of that section [New England] has not found expression in an emphatic demand for a lower range of duties on raw materials, which would put its manufacturers on a plane of equal advantage with those of other sections, with which they are now maintaining an unequal competition." Although New England has not yet shown any signs of carrying out the suggestions of the *Times*, several of the Western States, through their Republican political conventions, have pronounced in the strongest manner in favor of the repeal of the duties on lumber; and certain influential Republican Congressmen have secured a renomination only by pledging themselves to propose, and work for, the abolition of these duties in the next Congress. Whether their efforts will, or should, be effectual we do not undertake to say; but if they should, the result would inevitably be the pouring of vast quantities of Canadian spruce into our Northern States, at prices so much lower than those now paid that it will be for the interest of every one who contemplates building a house to begin operations at once. We are accustomed to speak of the "inexhaustible" spruce forests of Canada, but the fact is that those forests are very far from being inexhaustible, and Canada itself is developing with such rapidity that its consumption of timber is already very large; but there is enough timber to supply both countries for years to come, and the inevitable ultimate rise in price will hardly affect the present generation.

SOME student of American politics might find edification in the investigation of the political aspects of the strike in the anthracite region. There have been many circumstances connected with the strike incomprehensible to the general public, but pointing more and more clearly, as they accumulate, to a secret understanding between the leaders of the strike and certain politicians, which, if not the direct cause of the contest, has had the effect of encouraging and extending it. It will be remembered that, at the outbreak of the strike, as soon as it appeared that the operators were determined to resist the demands of the unions, there was a rush of prominent politicians to Pennsylvania. One of these gentlemen is said to have told the obdurate operators that unless the strike was speedily settled, the next Governor of Pennsylvania would be a Democrat; and distinguished Republican Senators and Governors, although they have not been quite so indiscreet, have been conspicuous ever since in their efforts to compel "arbitration" of the trouble, the Governor of Pennsylvania having recently announced his intention of calling an extra session of the Legislature, and, if necessary, of having the Constitution of Pennsylvania amended, so as to put it in the power of the Executive to enforce arbitration.

IT is not likely that all these expressions are mere incoherent ravings on the part of such sensible men as Senators Hanna, Quay and Penrose, and Governor Stone, and a reference to past history may show reason and consistency in them. A year or so ago, as every one recollects, there was a serious strike in the bituminous-coal region, led by the same John Mitchell who now directs the strike of the anthracite men. The conflict reached such a pitch that the attention of the country was aroused, when, just at the critical point, Senator Hanna was put forward as a peace-maker. An interview was arranged between him and Mr. Mitchell, and, as a result, a

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

friendly understanding was arrived at, the strike was called off, and everybody was happy again. The tact and diplomatic talent of Senator Hanna won deserved praise, and a Civic Federation was almost immediately formed, composed of distinguished divines, authors, "captains of industry," and others, intended to prevent all strikes in the future, by interposing its good offices for arbitration or settlement. Senator Hanna was made the Chairman of the Federation, which, as has since been remarked, did not contain a single representative of the anthracite interests, although the bituminous mines were represented.

IT would probably be unfair to the parties concerned to assume that a scheme had been formed to control, by means of Mr. Mitchell, the votes of the one hundred and forty-eight thousand men employed in anthracite mining, in the interest of a certain party, and its nominees, but it is not unlikely that Senator Hanna and his friends knew that, by favoring Mr. Mitchell's plans, they were establishing a substantial claim upon his gratitude. However that may be, the Civic Federation had not existed many months before Mr. Mitchell, with whom Senator Hanna had found it so easy to adjust the differences in the soft-coal region, appeared with a virtual demand to be placed at the head of the anthracite miners also, and to be armed with what Mr. Hewitt calls the "power of life and death" over their actions. By his own statement, Mitchell was never in an anthracite mine but once in his life, and his claim to authority over the anthracite miners seems to have rested solely on the influential support which he had gained. To the surprise, apparently, of his backers, the anthracite operators resisted. Senator Hanna was at once called in, without avail, and the machinery of the Civic Federation was set in motion, also to no purpose. Then began the singular allusions to the political importance of a speedy settlement, the outcries of partisan Republican newspapers for "compulsory arbitration," the predictions of disaster to the party unless the power of the Commonwealth of Pennsylvania were applied to the coercion of the operators, and the rather unaccountable actions of Governor Stone, which have now begun to show a certain consistency with each other, and with the events of the previous year. Meanwhile, the strike has resolved itself, not so much into a struggle between the operators and their men, as into one between the operators and a small clique of schemers, who are trying to distress the public, by cutting off the supply of coal, into support of their plans. In this attempt they are greatly assisted by a law of Pennsylvania, enacted some ten or twelve years ago, obviously in the interest of the union managers. Under this law no one can work as a miner in any anthracite mine in Pennsylvania, under penalty of a heavy fine, or of imprisonment, unless he holds a certificate, issued by a Board of Examiners, certifying, not that he is competent and intelligent, but that he has been employed in an anthracite mine for at least two years. The statute also forbids any person or corporation, under severe penalties, to employ any one, not furnished with a certificate, as a miner in any anthracite mine in the State, and provides that a register shall be kept of all certificated miners in every mining district. Even if the interest of the operators in having their work done efficiently, and the knowledge of their responsibility for accidents due to the incompetency of their men, were not sufficient to insure the employment of capable workmen, it is absurd to suppose that the mere fact of having spent two years in a mine would make a good man out of a vicious and stupid one, or that an intelligent and ambitious man could not learn so simple a trade in less than two years if he tried; and the evident interest of the statute is to play into the hands of the labor agitators, presumably in return for some promised equivalent, not only by encouraging and supporting strikes, through the almost insurmountable obstacle which the two-year clause places in the way of the employment of new men to take the place of strikers, but by placing in the hands of the union tyrants, through the registration lists, the means of pursuing, and bringing into the fold, one by one, all the certified miners in Pennsylvania. In this manner the way has been prepared for the grand struggle, which is now in progress, to subject the whole population of the coal-mining districts of the country to the dictation of a group of plotters; and the people who are now sadly wondering how they can get their coal-bins filled for the winter, or where they can get the money which will be required for filling them, may with advantage reflect that they are only paying, or will soon have to pay, the tax which, in the end, honest and simple people always have to pay for bad legislation, political trickery and industrial tyranny.

THE strike itself seems just now to be slowly disintegrating. Thousands of men are ready to labor in the mines, and would long ago have been at work, except for their fear of being assassinated by the ruffians who, as the newspapers inform us, are permitted, in the States of Pennsylvania and West Virginia, to surround at night the houses in which the new men live, and riddle them with rifle-bullets. Meanwhile, the leaders of the strike, with characteristic treachery, have, it is said, coolly abandoned more than a hundred thousand firemen, shovellers, laborers, hoisters and others, whom they induced or compelled to strike, in order to cripple the mines as completely as possible, and are distributing the money which flows in from assessments and contributions exclusively among the forty thousand members of the miners' union, leaving their allies and supporters to starve. It is more than likely that the strike managers count upon the deeds of violence which these poor creatures, prevented from going back to work by fear of assassination, as well as by their blind sentiment of loyalty, will commit when driven to desperation by the sight of the sufferings of their wives and children, as a means of influencing the public in support of their schemes; and the public should be careful not to be misled any further than it has already been, by cold-blooded plotters, at the same time that it should look with the charity which is quite consistent with firmness upon any excesses of the poor and ignorant, but not wilfully vicious, people who are the worst sufferers in a struggle apparently undertaken in the interest of heartless ambition.

THE new art, in architecture, seems to have received what may be called its official consecration by the award of a premium in the annual competition of the Société Centrale des Architectes for executed house-fronts to an advanced specimen of the new style, by M. Lavivotte, in the Avenue Rapp. The front is mostly in colored tiles, with a backing of armored concrete, a construction which permits the use of wide arches without any appreciable abutment, and other forms which would be of doubtful stability in ordinary masonary. In detail, the front is a tolerably extravagant specimen of the style of design which, as a distinguished French critic says, appears to be founded on the contortions of a worm that has swallowed a bone; and although there are many indications of an artistic feeling which is pleased with its emancipation from precedent, they are probably to most eyes less sympathetic than those of a French jury, obscured by the determined revolt against all the canons of art, not to say of construction, hitherto received. Whether the "art nouveau" will ever develop into anything really worthy of the name of art, or whether it will simply pass away like the other eccentricities which, in all the arts, have had their vogue for a few years, only to vanish into oblivion, remains to be seen; but it is safe to say that it will never make much progress until it abandons the attitude of ill-bred defiance of what may or may not be the prejudices of people of taste which has become more marked of late. M. Chédanne, in the Palace Hotel, employed a style of design which, while strikingly original, was not impertinently so, and had a great charm, even to those who doubted the artistic value of the innovation. Since then, many of those who have followed his lead, instead of refining and enriching the beauties of his work, have selected the eccentricities, making them more eccentric still, until they have developed a set of stock patterns of their own, which have already lost their originality, and never had any other merit. It is the theory of some critics that every great architectural style has been, substantially, the invention of one man. If this is true, the "art nouveau" still awaits the man who is to give it real artistic dignity.

AN ingenious man in Minnesota, who is building for himself a handsome shoe-store, with a front of polished granite, has thought of a method of reimbursing himself for its cost, by cutting on the granite front the names of politicians, wholesale dealers, and other people who wish to see themselves advertised, charging, according to the newspapers, two dollars and a half for each name. There is probably some mistake about this latter point, as two dollars and a half would not pay for cutting the letters in granite; but at ten times the price the space would probably be readily taken up. Each name is allotted an area of seventy-two square inches, and as a store front twenty-five feet wide and fifty feet high would contain, after deducting the windows, about a thousand such spaces, a very tolerable sum might be realized, above the cost of cutting the inscriptions, by a person with a large acquaintance among business-men and politicians, to go toward paying the cost of a stone front in a conspicuous location.

THE AMERICAN VIGNOLA.[1]—IX.

PART I.—THE FIVE ORDERS.

PEDIMENTS.

THE Gable upon a Classical building is called a *Pediment* (136). It consists of a Triangular piece of wall called the *Tympanum*, which is in the same plane as the Frieze below; of a *Horizontal Cornice*, which divides the Tympanum from the Frieze; and of two pieces of inclined cornice which surmount the Tympanum. The inclined or *Raking Cornice* is like the cornice which crowns the wall on the sides of the building, but the Cymatium is a little wider. The Horizontal Cornice has no Cymatium, and generally terminates in a Fillet, called the *Split Fillet*, which divides at the angle where the two Cornices come together.

If the Cymatium is a Cavetto, the under side of the Fillet beneath it is bevelled, either on the rake or along the wall; if it is an Ovolo, the same thing happens to the Fillet above it. With the Cyma Reversa both occur, with the Cyma Recta, neither, the fillets having no soffit. This is one of the reasons for employing this moulding in this place (137).

When a Cyma Recta is used in the Cymatium it occurs in four different forms (138), viz: 1, the profile of the moulding along the wall; 2, the profile of the raking moulding; 3, the line of intersection of these two mouldings; this lies in a vertical plane, set at 45 degrees; 4, the line of intersection of the two raking mouldings at the top. 1, 2 and 4 have the same projection but different heights; 1 and 3 have the same height but not the same projection.

According to Vignola the obtuse angle at the top of the Pediment is included within an arc of 90 degrees. It accordingly gives a slope of $22\frac{1}{2}$ degrees. This is a good rule for most cases. But if a building is high and narrow, the slope needs to be steeper, and if it is low and wide, flatter. Inasmuch, however, as, for a building of a given width, the higher it is, the larger is the scale of the Order employed and of all the details of the Order, it follows that, for a given width of front, the larger the mouldings are, the steeper must be the slope.

Upon this is founded the following rule for the Slope of Pediments, devised by Stanislas L'Eveillé (139):

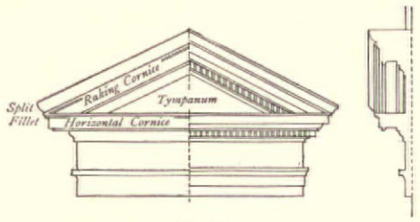


Fig. 136.

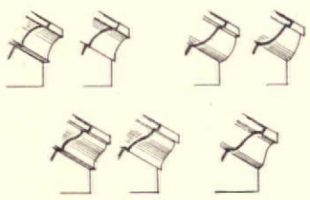


Fig. 137.

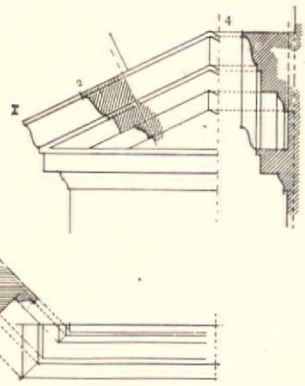


Fig. 138.

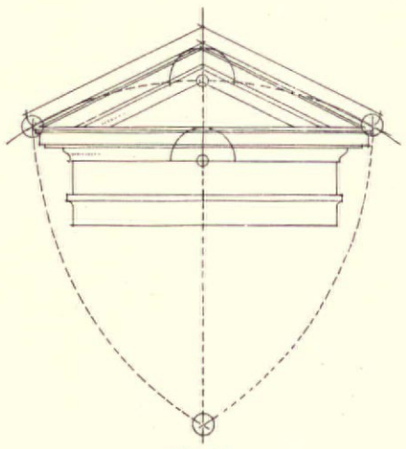


Fig. 139.

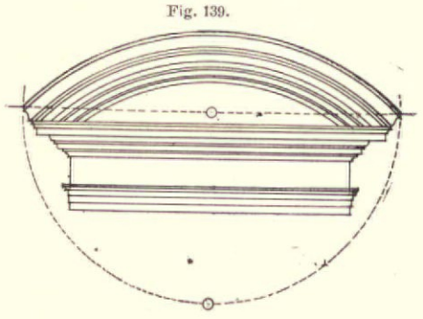


Fig. 140.

Taking the upper line of the Horizontal Cornice as one side, construct below it an equilateral triangle, and, taking the vertex of this triangle as a centre, and its side as a radius, describe an arc of 60 degrees. Taking, then, the summit of this arc as a centre, describe a circle, the radius of which is equal to the width of the horizontal cornice. Lines drawn from the extremities of the Corona tangent to this circle will give the upper line of the Raking Corona. It is obvious that the larger the cornice, relatively to the length of the front, the steeper will be the slope. It is also plain that this rule gives steeper Pediments for the Corinthian and Ionic Orders than for the Doric and Tuscan, and for the Roman Orders than for the Greek.

Circular, or *Curved*, *Pediments* have a sweep of 90 degrees (140), starting at an angle of 45 degrees.

When pediments are used merely for ornament the upper part is sometimes omitted, giving a *Broken Pediment* (141).

If the moulding that crowns the Corona is omitted the faces of the three Coronas are continuous (142).

PEDESTALS.

As has already been said, a short Pier is called a Post, and, if it supports something, a Pedestal, and the Pedestals that support Columns are generally made one-third the height of the Column. The Cap is one-ninth the height of the Pedestal, and generally consists of a Bed-mould and Corona. There is no Cymatium, a gutter being obviously out of place, but the Corona is crowned by a fillet and small Cyma Reversa. The Base, which is two-ninths of the height of the Pedestal, or, according to Vignola, only one-ninth, like the Cap, consists of a Plinth and Base-mouldings, among which a Cyma Recta is generally conspicuous, with a Torus below it.

The mouldings, in both Cap and Base, are fewer and consequently larger and simpler in the Tuscan and Doric Orders than in the Ionic and Corinthian, the Tuscan, according to Vignola, having no Corona, and the Corinthian a Necking and Astragal. The Cap projects less than its own height, in many examples, and the Plinth just as much as the Corona.

[1] Continued from No. 1390, page 53.

But Pedestals vary greatly both in their proportions and in their mouldings.

PARAPETS AND BALUSTRADES.

A wall low enough to lean upon is called a *Parapet*, and whether low or high is often strengthened by occasional Posts or Pedestals, sometimes of the same height, sometimes higher. In either case the wall or parapet has a Cap and Base which may or may not be like those of the Pedestals or Posts. A similar strip of wall, with the wall continued above the Cap, is called a *Continuous Pedestal*. This often occurs between the Pedestals that support Pilasters.

In antiquity, Parapets were often pierced by triangular penetrations, apparently in imitation of wooden fences (143). But in modern times the openings in Parapets are generally filled with a sort of colonnade of dwarfed columns called *Balusters*. These frequently occupy the whole space between one Post or Pedestal and the next, forming a *Balustrade* (144). If the distance is great, so that the Cap has to be made of several lengths of stone, a block called an *Uncut Baluster* is placed under the joint. Not more than a dozen Balusters should occur together without such interruption. Against the Pedestal is often set a *Half-Baluster*, or, which is better, half of an Uncut Baluster, to support the end of the Upper Rail (145).

The Cap and Base of the Pedestals, or of the Parapet or Continuous Pedestal, are called in a Balustrade the *Upper* and *Lower Rails*. The Baluster supports the Upper Rail as a Column supports an Entablature, and stands upon the Lower Rail as upon a Stylobate (146). It has its own Cap, the height of which, including the Astragal, is one-quarter the height of the Baluster, and which consists of a plain Abacus, Echinus and Fillet and Necking. These three members are of equal height, as in the Tuscan and Doric Capitals.

The Base of the Baluster is also one-quarter its total height and resembles the Attic Base. The Scotia, as in the Greek Attic Base, is generally made the principal member.

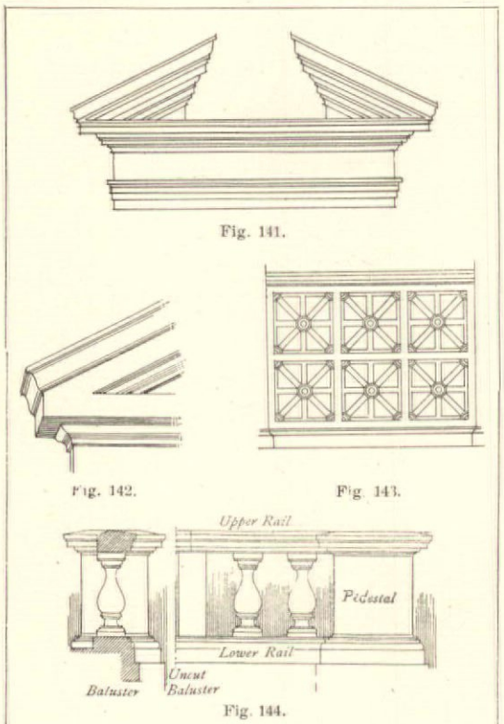


Fig. 141.

Fig. 142.

Fig. 143.

Fig. 144.

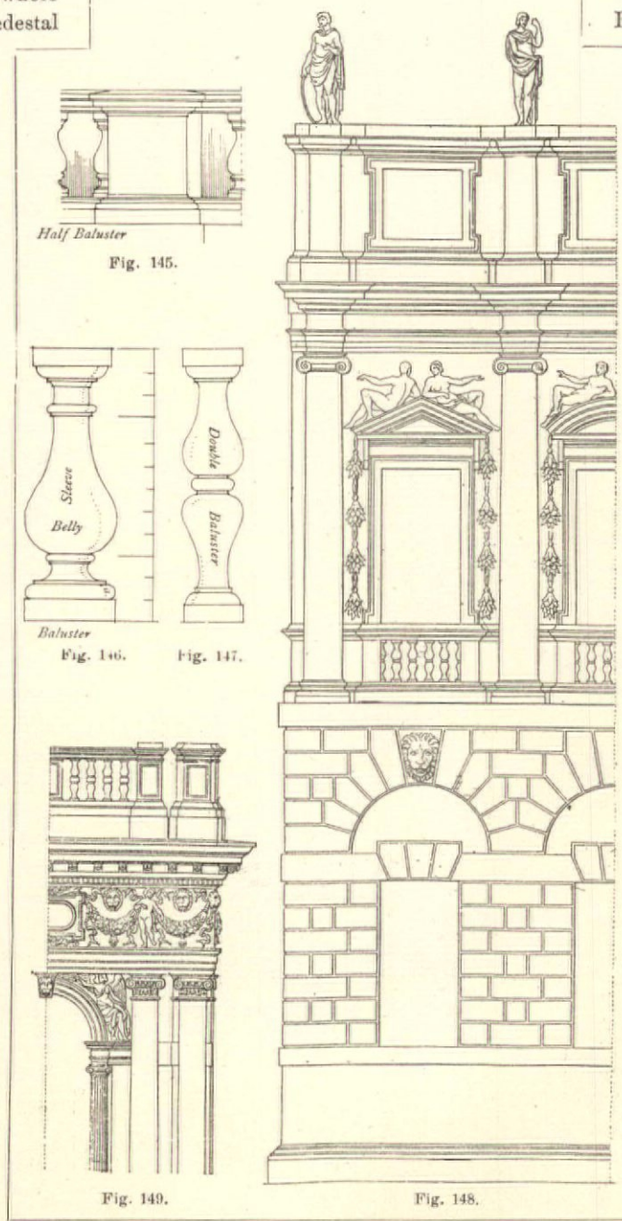


Fig. 145.

Fig. 146.

Fig. 147.

Fig. 149.

Fig. 148.

Between the Cap and Base is the Shaft, or *Sleeve*, which has the outline of a Quirked Cyma Reversa, the greatest diameter, or *Belly*, coming at one-fourth of its height, or one-third the height of the Baluster. Its width at this point is also one-third the height of the Baluster, as is also that of the Plinth of the Base, exactly, and the width of the Abacus, almost. The Necking is less than half as wide. The point of contrary-flexure in the Cyma Reversa is half way between Cap and Base, or between the Upper and Lower Rails. But these proportions are made somewhat lighter for use with the Ionic and Corinthian Orders.

The Rails are sometimes, in height, one-sixth and two-sixths of the space between them, like the Cap and Base of a Continuous Pedestal; but they are often made much heavier, even one-third and one-half.

Instead of the Cyma Reversa, a Beak-moulding is often used, and other variations are frequent. Of these the most important is the so-called *Double Baluster*, which consists of two small Balusters, set together base to base (147). Vignola also used a high block under the Plinth. Balusters are often made square in section, like piers, instead of round, like columns.

Balusters are set about half their height apart, on centres.

A Balustrade, like a Parapet, is intended to lean upon, and should not be more than about three or four feet high. While, therefore, Columns and Entablatures are proportioned to the size of the buildings in which they occur, varying in height from ten or twelve feet to fifty or sixty, Balustrades, like steps, are proportioned to the size of the human figure, and in large buildings are relatively much smaller than in small ones. They thus serve, as do steps, and as does the human figure when introduced into a drawing, to indicate the scale of a building.

But in very large buildings balustrades have sometimes been made of colossal dimensions, that on the top of the front of St. Peter's, for example, being about eight feet high.

ATTICS.

When a Parapet is placed on top of an Entablature it is called an *Attic*, that is to say, an "Athenian" story (148). Like Pedestals, Attics vary much in size and in architectural treatment. They are generally made about a quarter as high as the Order below, and should not be more than a third, and they should have a high Plinth, or even a double Plinth, so as not to be too much hidden by the projection of the Cornices on which they stand.

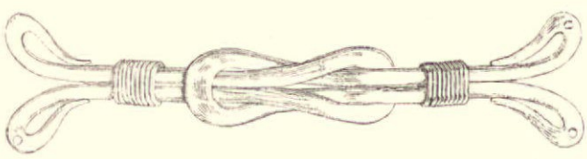
The place of an Attic is often taken by Balustrades (149), which also should have high Plinths, below the lower rail.

W. R. WARE.

THE ORNAMENTAL METALWORK OF P. L. BRINDEAU.

PAUL-LOUIS BRINDEAU practises an art that is simple, but elegant in line and happy in expression. A little hammer, a vice, chisels, a file, a few rods and leaves of thin copper, and from his hands spring appliqué work, escutcheons, pateras, hinges, door-handles, buckles, buttons, roses, of most marvellous effectiveness. It is a kind of jewelry for furniture, in base metal to be sure, without jewels or enamel, but it is nevertheless jewelry, with forms particularly fitted to their use: no part of it injures one or scratches; the hand meets with only friendly surfaces, the eye sees only graceful curves.

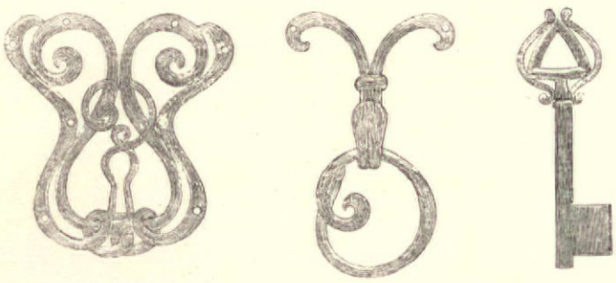
This easily vaporizable metalwork, which one would think would be torn apart like goldsmith's work at the least pull, is twisted upon itself in such a manner that the whole gives the resistance of a massive casting. It holds what it is meant to hold. With its ornamentation it transforms the most commonplace bit of furniture into a choice object, a pine cupboard into the most stylish of buffets. The patinas, from bronze to *vert de gris*, vary the tones of the work.



Sometimes bell-metal, yellow copper and red copper are allied in polychromatic interlacements, giving the most diverse of effects, and the most unexpected.

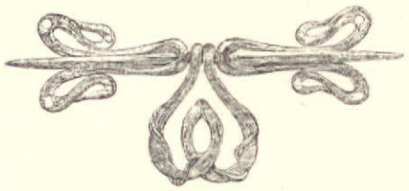
The exhibition of 1900 contained a series of this work of Brindeau's which was purchased by the Museé des Arts at Zurich. Since then, we have seen him at each Salon, this restless searcher, to whom the decoration of furniture, and of the house itself, owes more than one grace; and this year we see him again with a new blossom of his curious talent. All his work, as art, is perfectly firm. Its floral stylization unites in harmonious blossoming in an ensemble which is solid without heaviness.

Dampt, Sauvage, Marrou, Gallé, Prouvé, Robert, rivals of Brindeau's in work of analogous kinds, have carried the art of artistic ironwork to a degree of intellectuality that is impressive. It is, in truth, poetry in metal. But Brindeau has removed himself from a



style of work which is too arduous, which necessitated special workmen, and said to himself that the artist ought to produce his work by himself, with his own fingers, without any aid. Therefore, he translates his own thoughts, materializes his own forms. He has refused to be chief of a force, editing, as it were, in innumerable examples, work that he has designed on paper. When he places a copper wire in the jaws of his vice, he knows only one thing: the use to which he proposes the object shall be put. Then he starts, he bends, twists and turns the metal, flattening it here and there with a slight tap of his little hammer, all the time seeking for the right line, the best relief through a persevering study of possible combinations.

Better than any one he knows the plastic qualities of the material he employs, and only asks that which the material can grant him.



He attains extraordinary sumptuosity of line, multiplies them by symmetry, by repetitions and geometrical balancings. What he does with one wire, he repeats with another, with two others, and connects them. The thousand sinuosities which set out to distance one another twist upon one another and come back to the same end. They are not the issue of mere caprice; they are rational in their simplicity, and combine to the same end.

He mingles here and there leafwork with the wire, the plane surface with the relief, and ventures sometimes on fruits and flowers. His style is impressed with his own handiwork. It is rudimentary — a little brusque; but we like to have it so. His success is of good quality, and keeps on growing. Various museums of Europe are

beginning to dispute with one another for his product. The show-windows before which pilgrims of the renewed cult of form and decoration go into ecstacies are enriched with these bold and slender bits of metalwork. The amateurs, in whom intelligence is quickening every day, thanks to a criticism better comprehending its educational opportunity, present themselves daily at the door of the good artisan, dreaming of bearing away with them some "find" which shall lend pride to their hearthstone. Periodicals, reviews, journals, magazines photograph and spread broadcast his supple and enduring ideas.

His work is wrongfully reproached with being a little too meagre, too gracile, since really these tenuous lines are amalgamated and so intertwined as to offer a most satisfactory resistance. The eye is too much habituated to the heavy forms of cast metal, to round bosses, modelled after the motives of the statuaries. Here there is nothing of that sort. The docile wire follows the thought of the artist who thinks of nothing save of the use to which his work is to be put. — *L. Riotor in the Revue des Arts Decoratifs.*

ROMAN AND ROMANESQUE FRANCE.[1] — II.

ANTIPOLIS — ANTIBES.

AS early as 125 B. C. the Romans had a road to Spain via the Pyrenees — the Via Domitia; but the great Aurelian way which, passing by Genoa, fell into the older road at Arles was a subsequent work due to the Consul Aurelius Cotta. The Camin Aourelian, in Provençal, may still be traced along the shores of the Mediterranean, where it had the protection of the Roman fleet; then, after passing Ventimiglia (Albium Intemelium) and Mentone (Surnane) it crossed the Alps at Mont Agel (Alpe Summa), where we now find the ruins of Turbie, a gigantic fragment of the trophy celebrating the victories of Augustus over the barbarians. The road kept on the high ground after crossing the Alps (then the frontier between Italy and Gaul), and passing the Greek Colony of Nice (Nicæa) on the north, arrived at Cimiez (Cemenetium), where Roman remains prove the importance of the ancient town. The Var was then crossed, and Antibes (Antipolis), a little Greek port facing Nice, became one of the most important stations upon the Via Aurelia.

Whether the Provençal *Antiboul* was an offspring of Nice or of Marseilles, the learned have not yet determined, but it is certain, says M. Leuthéric, in his book upon the Riviera, that the Greek town dated back to the fourth or fifth century B. C.; for in 1866 the discovery of a stone with an inscription in archaic characters put the question beyond doubt. This stone is of a dark-green color, 22 inches long by 8 inches wide, and of the form of an egg, with the inscription written lengthwise in four lines. Literally translated it reads, "I am Terpon, servant of the august goddess Amphrodite; may Cypris recompense with her favors those who have placed me here." M. Leuthéric gives the views of various archæologists upon the

[1] Continued from No. 1376, page 47.

interpretation, which may be summed-up concisely as follows: The letters resemble those of archaic Ionian inscriptions mixed up with Greek ones about the end of the fifth century B. C. *Betuli*, or sacred stones, were worshipped by the early inhabitants of Chaldea, Phœnicia, Syria and Asia Minor. They were usually unhewn stones, black ones being especially adorable. Pausanias speaks of it as an old form of Greek worship, and many *betuli* which have survived to this period represent deities of the cycle of the primitive Aphrodite, a goddess reverenced in the ancient sanctuaries of the Island of Cyprus, "particularly in the temple of Golgos under the form of a conical stone," the analogue of the sacred stone of Antipolis. I had considerable difficulty in finding the stone. I was told it was near the church with many Roman slabs and *stelæ*, but it was not. Then it dawned upon me that it might be in the Hôtel de Ville, as a large Roman capital is placed in the hall of that building; so I asked the *concierge* if they had any sort of museum. "Yes," he answered, "but it is closed now." Thereupon another man came forward and said it was open, and "would I walk up." This we did, and after much fumbling at the door, which was locked, and a good deal of shutter unbarring, a very dusty collection of shells and prehistoric stones, and a few inscribed slabs became visible. The slabs were post-Roman, and nothing corresponded to the description of the stone in M. Leuthéric's book. However, after a considerable amount of conversation, the custodian lifted up a huge pebble, of exactly the form of those to be found on any sea-shore, and on it was the inscription as quoted. Whether the theory of the stone having been brought to its present shape by the action of the mountain torrent, and having been inscribed and made a sacred stone by some early settlers in Antipolis, be a fact or not must be left for archæologists to decide. But there surely cannot be two opinions upon the point that the authorities of the town might arrange their little collection better; and to keep it dusted might not, perhaps, be beyond their means.

The ancient remains at Antibes are few, by reason of the fact that each succession of occupants used up the stones placed by their forerunners, as was not uncommon all the world over. Rome placed its arsenal upon the ruins of the Greek city; the Middle Age builders used up Roman materials. Goths, Lombards and Saracens in succession destroyed in order to rebuild; and Vauban completed the work of destruction by surrounding the town with forts and battlements, built in a great degree with older fragments. These also have mostly been demolished — this time for the benefit of the inhabitants, and a new Antibes is rising up in the usual French manner. A large place is arranged with a central bandstand. Here are, for the present, some large buildings — a hotel, a military club and a few business premises. From this place, unfinished roads diverge at all the angles. Farther on, another place (at present unbuilt upon) is marked out with another set of diverging boulevards, finished only so far as the planting of young trees is concerned. Why cannot this sensible plan be adopted in the outskirts of our older towns instead of leaving all building-plans to the haphazard of private individuals, with the result that the new parts of a town soon get as congested as the older quarters.

Whether the church occupies the site of the Temple of Diana of Ephesus it is impossible to say. The two great towers which flank it are not of Roman times, but are composed partly of Roman stones, some bearing inscriptions. The theatre, which was in a ruinous condition, was razed to the ground in 1691; but a few remains of the Circus are said to be still visible in the cellars of some of the houses. The ground upon which the theatre stood was levelled and the only memorial of it still existing is an inscription "dedicated to the memory of a poor lad, perhaps a captive from the distant North, hired by some theatrical manager to appear on the stage at Antibes, where he died in the height of his success: 'Saltavit et placuit.'" (Leuthéric.) This slab has been built into the outside wall of the public library.

But modern Antibes is beautiful in many ways. It stands sentinel, as it were, to the cape, which is a mass of olive woods bounded by a wild, rocky coast. Upon the summit of the cape is a chapel dedicated to Notre Dame de Bon Espérance filled with ex votos given in gratitude by those who go down to the sea in ships and who have been saved from the dangers of the deep by the intercession of the Blessed Virgin — "Star of the Sea." The art displayed in some of the pictures does not equal the faith of the donors; but the effect of some models of ships hanging from wrought-iron brackets, accompanied by flags and lights, is picturesque in spite of the bad taste of the altars and of the building in general. Farther on is the modern "Star of the Sea," a first-class light-house which sends its brilliance many a mile to warn mariners of the dangers of the coast. In July the fishermen visit in procession the chapel, mounting the hill by the old paved, so-called Roman road, barefooted — thus the local guide-book as evidence of their religious sentiments; but a prettier "sentiment" is the tying on to the prows of their boats and to their cork floats of a piece of blessed palm.

Two or three portals, notably one in the main street, are worthy attention, and the fountain near the old place must not be passed by without a glance.

S. Beale.

The increased Use of Aluminium. — The remarkable increase in the use of aluminium during the past ten years is shown by the chart of mineral products of the United States, just issued by the Geological Survey at Washington. In 1891 the output was 259,885 pounds. In 1901 it was 7,150,000 pounds. — *Exchange.*

COUTURE AND DUTUIT.

FEW modern paintings excited more interest than "The Decadence of the Romans," by Thomas Couture. He was a morose artist, who lived in seclusion and brooded over his failures. He was out of harmony with his time, and it was really Imperial Paris which he satirized under the figures of ancient Romans. It is remarkable, however, that several able artists found their way to his studio. The despotism of the painter had the effect of making them indignant against his practice and the principles on which it was based. It is also curious that M. Dutuit, who has bequeathed to the Municipal Council of Paris a most valuable collection of paintings, and who was always a wealthy amateur, did not disdain serving the painter as a *rapin*, or pupil-servant. The incident is related by Couture in his "*Méthode et Entretien d'Atelier.*" We give a translation of the passage: —

"About 1842 I occupied a modest atelier in the Passage du Bois-de-Boulogne. The year before I exhibited a picture of a young Venetian after an orgy. It was noticed and purchased. Thereupon I abandoned competitions and sought the support of the public. From my début it was benevolent towards me. One day some one knocked timidly at my door and on bidding him enter I saw a singular person. His clothes were badly made, his shoes were large and heavy, and his trousers being too short allowed his blue stockings to be visible; in fact, he seemed to be clad in blue, and under his arm he carried one of those big umbrellas seen in the country and which was also of blue stuff. He hesitated about entering the atelier, his face was pale and troubled, and he appeared to be a mixture of a sacristan and a mendicant. He told me in a trembling voice that he would be happy to receive my instructions, and came to inquire whether I would take him for a disciple. I was ambitious, and in this case thought I would have more embarrassment than profit, so I brutally refused. He appeared very sorry for his intrusion and bent his head as if he were a culprit. I was moved by his extreme modesty and asked him would he care to be my *rapin*. That, he said, would be his greatest happiness, and I told him to make arrangements accordingly.

"He came back with an easel of whitewood, a small box, a couple of stools and a mattress. I instructed him about keeping the atelier in order. As a rule, the services are only rendered by young boys, and are never sought from a man, but the visitor was so humble he could be requested to do everything. Never was the atelier so well kept; the palettes were always clean and shining. He carefully watched me, and if I dropped a pencil picked it up and presented it to me with an old-fashioned bow. When the day was over he attended me to my lodging, and on leaving renewed his salutation. After some days he told me that I had said nothing about the fee he was to pay, and asked if seventy-five francs a month would be accepted. I explained to him that the best men were only paid twenty-five francs, and as he rendered me such good service I did not need any fees. He replied that in those ateliers there were a crowd of students who might never have the advantage of working with the master. As he insisted, I told him to give me the seventy-five francs, if the payment caused him no inconvenience, and to say no more on the subject. But he contrived to make a little packet of the money at the end of each month which I was sure to find in seeking for something else. Sometimes he wanted me to spend the evening with him and I refused. But once I accepted the invitation. We went to a good restaurant and were well served. I became alarmed about the expense for his sake, but he said he knew the owner, who was grateful for some little services he had done to him. We often went to auction-rooms, and I found he was skilful in the judging of old works. Once he said that a work by Hobbema, which we had admired, was sold for 37,000 francs. I replied they were happy who were able to acquire such masterpieces. That appeared to give him pleasure.

"He was not without intelligence and never neglected his service. It was impossible to tell his age — whether he was twenty-eight or sixty. He was bent like an old man, but one was interested in him and pitied him. We remained eighteen months together. A new *rapin* had arrived, and the old one had become my friend. One day he came to me in some excitement and announced that he was compelled to leave that evening, and would perhaps be absent for a couple of months. The next day a woman, who was a model, entered and told me that my student was a millionaire, and that he had gone in pursuit of a debtor who owed him 1,500,000 francs. I was surprised, for I supposed from what he said that he possessed not more than from four to five thousand francs of income. As he did not return, I imagined he had lost everything.

"Long afterwards in going to Havre I passed by Rouen, a city of which my friend had often spoken. I inquired after him, but was informed the only one of the name was the richest man in the country. However, I went to the house indicated as his residence and asked to see the master. I saw an old gentleman who bore some resemblance to my friend. I asked him if he had a son who was occupied with painting. In replying he told me who I was and said my visit was providential, for his son had only arrived the day before from Italy. When my ex-pupil appeared there was little change in his appearance. He conducted me to his room, which, he said, no stranger was allowed to visit. I was amazed at the number of marvellous masterpieces, and among them were several which I had looked at with him in auction-rooms. I questioned him if he was rich, He answered yes, and that he had not informed me of his position in order

that he might obtain sincere advice. Then he told me that if I wished he would bring me to Italy and that we should travel like princes.

"When he inquired about my affairs I told him that after toiling hard to obtain success in the Salon, the places assigned to my pictures were so bad that my efforts were lost. He asked if I had not influential acquaintances such as a dentist or a valet, and then he said we must change our rôles and that he would become my guide. The next day we travelled to Paris in a carriage. We traversed the dirty and narrow streets which then surrounded the Louvre, and went to a gallery where they were arranging the pictures for the Salon exhibition. He pointed out an assistant to me and bade me tell the man that my picture was numbered 334, and he would oblige me if it found a good place. I was to give him ten francs. The process was repeated with other assistants, and finally by his direction I gave twenty francs to the chief of the men. All the assistants seemed to be acquainted with my friend. A week afterwards the Salon was opened, my pictures were admirably hung, and I gained my first public success. Then he said to me, 'The farce is over, you are recognized by the public, and henceforth your pictures will have to occupy good positions. Take my advice, one never succeeds through great people; they are greedy and make their profit out of the simpletons who come to them. In preference seek the aid of humble people; by paying them you will be well served.' We then parted, and I have not seen my old pupil since."

Couture died several years before his friend. — *The Architect.*

THE LIGHTNING RESEARCH COMMITTEE.

THE Lightning Research Committee, organized by the R. I. B. A. and the Surveyors' Institution, in a recent communication to observers state that they are now in possession of a large number of first-hand reports on cases of damage to buildings from lightning-stroke. As regards the general character of the injuries to which *non*-protected buildings are subject from this cause, the Committee consider that the information already collected furnishes ample material for deliberation, and that it is unnecessary further to multiply observations as to *non*-protected buildings.

Data to hand, however, respecting "protected" buildings which have been struck are few, and generally meagre and unsatisfactory; and as the object of the Committee is to improve existing methods of protection they propose for the future to confine their investigations to buildings which have been struck in spite of being provided with lightning-conductors.

In order to determine the efficiency or otherwise of the conductor the Committee are of opinion that it is necessary to scrutinize minutely the actual conditions of the building affected. Observers are therefore requested to ascertain first whether the building struck is provided with a conductor, and if this be the case the structure should be carefully examined at once on the lines suggested below, and a photograph taken before any repairs, temporary or otherwise, are effected.[1]

Details additional to those indicated in the original form of questions are requisite to the more limited inquiry now contemplated. A general description should be given of the surroundings, especially of elevated buildings in the vicinity, and photographs should be taken in cases of importance; and if these elevated buildings are provided with lightning-conductors their positions and heights should be given.

The Committee suggest that the following points, drawn up for the Committee by Sir Oliver Lodge, should, *as far as possible*, be attended to by observers in making records of damage: —

1. Any signs or indications of where the flash appears to have first struck, and an account of the damage done.

2. A specification and drawing of the metalwork of the building, paying special attention to metal of every kind which comes anywhere in the neighborhood of the conductor, whether roof-guttering, lead-covering, rain-water spouts, sewer-ventilators, telephone-wires, bell-wires, gas-pipes, ornamental railings, etc., carefully ascertaining whether any of these were either purposely or accidentally connected with the lightning-conductor, and, if not, what their nearest distance was from it.

In the drawing all metals may be indicated in *red*, no matter of what kind they may be; the hypothetical path of the lightning, as appears to the observer most probable, may be sketched in *blue*, remembering that bifurcation of path is not unlikely. Places of damage may be indicated by a blue swelling or patch, the size of the patch giving a rough idea of the relative damage, and an arrow being employed, when necessary, to call attention to any small patches, liable to be overlooked. The patches may be numbered, and the nature of the damage at each place stated in the description. Any place where fire broke out is to be specially attended to.

3. The nature and condition of the conductor, especially with reference to its continuity, its earth, and its elevation; also how fixed, and, if carried horizontally, its length as compared with the vertical height of its terminal above the ground; also note whether it made any sharp curves or loops round projections of the building, or took an indirect course. Cases of damage where there have been more than one or several conductors are specially important.

In the case of church steeples, the wind-vane should receive special attention, and the mode in which its rod terminates in the steeple should be ascertained.

In the case of chimneys, any internal metal flue should be carefully specified. Likewise, any indication that the flash took the column of hot air, in preference to the conductor, should be recorded; also whether the conductor was bent or curved over the mouth of the chimney or not.

In any case of importance the earth of the conductor should be specially examined, being, if possible, dug down to for this purpose; and a complete specification of the nature of the earth, the nature of the soil, and of any metal ramifications as well as of moisture in its neighborhood, should be made.

Any signs that the discharge has entered the earth should be recorded; and if the conductor is at any point damaged or otherwise affected, this should be specified, and, when interesting, a sample of the damaged portion should be sent. If the conductor has recently been examined and tested, or otherwise reported on, the fact should be stated. — *Journal of the Royal Institute of British Architects.*

[1] The Committee wish it to be understood that they are prepared to defray actual out-of-pocket expenses, and also a moderate charge for the photographer's services, provided that complete details of the disaster be furnished within a few days after the occurrence, and that an account of the expenses incurred be sent in with the observer's report.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ELEVATIONS AND SECTION: CENTRAL BAPTIST CHURCH, WAYNE, PA. MESSRS. D. K. BOYD AND L. V. BOYD, ASSOCIATED ARCHITECTS, PHILADELPHIA, PA.

PEDESTALS AND PILASTERS.

PEDIMENTS.

FOR description of this and the preceding plate, see "The American Vignola" elsewhere in this issue.

ROMAN CATHOLIC CHURCH, NEW YORK, N. Y. MR. ELLIOTT LYNCH, ARCHITECT, NEW YORK, N. Y.

[The following named illustration may be found by reference to our advertising pages.]

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: THE "FOUNTAIN OF CERES." MR. EDWIN F. ELWELL, SCULPTOR; — GRAPHIC ARTS BUILDING. MESSRS. PEABODY & STEARNS, ARCHITECTS.

[Additional illustrations in the International Edition.]

'THE EMPIRE," NO. 333 COMMONWEALTH AVE., BOSTON, MASS. MESSRS. MCKAY & DUNHAM, ARCHITECTS, BOSTON, MASS.

ENTRANCE TO THE SAME.

THE CENTRAL BAPTIST CHURCH, WAYNE, PA. MESSRS. D. K. BOYD AND L. V. BOYD, ASSOCIATED ARCHITECTS, PHILADELPHIA, PA.

THE SATURDAY-CLUB BUILDING, WAYNE, PA. MR. DAVID KNICKERBACKER BOYD, ARCHITECT, PHILADELPHIA, PA.

ENTRANCE TO HOUSE OF EDWIN U. CURTIS, ESQ., BAY STATE ROAD, BOSTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

VIEWS IN ANTIBES, FRANCE.

SEE article elsewhere in this issue.

"ORIGINALITY" AND L'ART NOUVEAU.

WE believe our readers may like to see more of the eccentricities that are being published as examples of the new STYLE in *Architektonische Monatshefte.*

THE NEW CHURCH OF ST. PAUL, BASEL, SWITZERLAND. MESSRS. CURJEL & MOSER, ARCHITECTS.

THIS and the following plate are copied from *Schweizerische Bauzeitung.*

PLANS AND SECTION OF THE SAME.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

WHEN DO BUILDING OPERATIONS BEGIN?

MOLINE, ILL.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you say if this point has been legally determined: "What constitutes the first beginning of work on a building or wall?" This is to settle who is to build a certain party-wall. Is it letting of contracts, staking out of building, beginning to dig, or laying the foundations? An answer will be greatly appreciated by

Yours truly, OLOF Z. CERVIN.

[WE have an impression, from memory only, that the beginning of work on a building is, legally, the beginning of digging or other work on the actual site. This would not include the setting of the batter-boards, which are set outside the site, and are placed only as a preliminary to the actual building work. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

BIGGEST KANSAS COTTONWOOD. — In the Kansas Capitol square at Topeka stands a handsome cottonwood tree that has a history. Major T. J. Anderson, who is its historian, and when it was struggling for existence its friend and protector, says it first took root in 1869. It sprang from a seed which had found lodgment in the stoneyard where the contractors were dressing stone for the superstructure of the east wing of the Capitol. In the spring of 1870, when the men, fortified by a new legislative appropriation, returned to work after the winter's lay-off, the little sprout had taken firm root among the stone chips, and it was so green and vigorous in the waste that surrounded it that it attracted attention. It was in the way and the workmen wanted to pull it up, but Major Anderson interceded for it and a little pen was built around it. Henry Worrall said it was a "male" tree and would shed no "cotton," which added to the interest in it, and so it grew and flourished in the midst of the little desert of rocks. After many years the east wing was completed and the stoneyard was removed and blue grass took the place of the stone chips. In 1895 the tree was again in peril. It had grown into majestic beauty, and was the monarch of the Capitol square, but it was not located exactly to suit a landscape-gardener who had been imported from New York to "improve" the grounds, and he marked it for the axe. Again the friends of the tree came to the rescue and Governor Morrill ordered that it be saved. Men who frequent Topeka from other parts of the State agree that it is the largest cottonwood tree in Kansas, and, with the exception of an occasional elm, the most graceful. It is not so tall as some trees, being only about 85 feet, but its spread is 100 feet, forming a circumference of about 315 feet, and its foliage, when the sun is at the zenith, shades an area of 7,854 square feet. The circumference of its trunk is 12 feet. It is a favorite playground of children, and men and women seek its shelter from the summer sun. It came into existence almost at the beginning of the construction of the State-house, and lives to see the east wing begin to decay. — *Kansas City Times-Star.*

THE TABLET OF MENA. — Eadweard Muybridge, whose photographic investigation of animal locomotion attracted wide attention a number of years ago, has written the following letter to the London *Times*: "In the new volumes of the '*Encyclopædia Britannica*' is reproduced in the article 'Egyptology' a tablet of Mena dating from the first dynasty, or about 4700 B.C., and is the oldest written sentence yet discovered. In '*A History of Egypt*,' by W. M. Flinders Petrie, the author, referring to the Egyptian artists of the fourth dynasty, says: 'They did not make a work of art as such, but they rivalled nature as closely as possible.' Two figures — a bull and a deer — on the tablet of Mena afford a remarkable confirmation of the Professor's statement, in regard to the knowledge and expression of motion by the sculptor of this age. A bull striving to attain his utmost speed is represented in a phase of movement which after a lapse of sixty-six centuries is reproduced in a photo-engraving illustrating some consecutive phases in the stride of a horse, published in the '*Century Dictionary*' under the heading of 'Gallop,' and in the '*Standard Dictionary*' in its definition of 'Movement.' The phase employed by the Egyptian artist has been, until recent years, very rarely used in art; the nearest approach to it that I can at this moment recall is in a fresco painting on the walls of the Campo Santo at Pisa, supposed to have been executed by Pisano. It, like the Mena tablet, illustrates a phase of the transverse gallop — a system of motion adopted by the horse, the ox, and the greater number of animals, whether single-toed, cloven, or soft-footed, when they exert their utmost power to attain their highest speed. In the lowest line of figures on the tablet is a deer, evidently jumping over an obstacle. The animal is represented with all its legs flexed, in pairs, under its body. A precisely similar phase may be found in a series in the library of the British Museum, demonstrating a jump which sometimes takes place in the rotatory gallop of the deer, which system of motion is always used by the deer and also by the dog, when from caprice or necessity they endeavor to make rapid progress. This distinctive method of galloping was unknown, and, indeed, unsuspected, by us moderns, until revealed by photographic investigation of animal locomotion; but it was apparently well known to the early artists of Egypt."

SIMILARITY BETWEEN STANDARD PATTERNS AND GEOLOGICAL FORMATIONS. — The increased use of natural objects in what, for lack of a better term, is called industrial art, is largely due to some lectures delivered not long ago by university graduates before the schools of art design in this city, says the New York *Evening Post.* Prior to that time the work had been either along conventional lines or else entirely original, frequently painfully original. The lecturers called attention to the remarkable beauty and utility of many of the fossils, both plant and animal. What made the matter more interesting was the resemblance, they pointed out, between many standard patterns in textiles and designs in metalwork and commonplace features in the earth strata. The black-and-white-dotted calico might have been printed from the rain-marks found in the old red sandstone in the Connecticut River. The dot-and-line pattern so common in men's neckties is almost a copy of the graptolites found in the State of New York. The *arabesquerie* of Moorish interiors is a fair imitation of the bark of the *lepidodendra*, and many of the spirals used on wall-papers and carpets find a prototype in either geologic cycads or some species still living in Australia. These lectures have borne much more fruit than is commonly known. Hundreds of original designs made in the past six years are either borrowed or modified from these sketches by Mother Nature written upon the rocks. A woman who gets up fancy silk patterns for neckwear acted upon the advice in the lecture and devised some 15 or 20 arrangements of color based upon the Franklinite ores in New Jersey. These consist of mixtures of different-colored crystals: black, scarlet, gold, white, brown, green and bluish, and are always restful and at the same time impressive. In these Nature has harmonized the combination of bright colors just exactly as the Tartars do in Russian Tartary. Every one of the Franklinite designs made a hit, and has been seen on Broadway in tens of thousands of cravats and scarfs.

SACRILEGE AT STRATFORD-ON-AVON. — Can nothing be done, asks a correspondent of the *Times*, to stop the sad desecration that is now going on at Stratford-on-Avon under the guise of doing honor to Shakespeare? His house is carefully preserved and decently shown; but the desecration of the fine church is almost a national scandal. I found the church-doors open and guarded by men who demanded a fixed fee for admission — a fee which is absolutely illegal in any English parish-church. The visitors, having thus had a practical lesson that they were admitted to a show, treated the place as a showroom and nothing more — talking, laughing, kodaking, and sandwich-eating — no man forbidding them. Photographs and other memorials are openly sold inside the church; the sacred building is turned into a house of merchandise, and the whole show is run on the vulgar lines of a catchpenny and money-making exhibition. I have no doubt that the vicar and churchwardens lay the flattering unction to their souls that the money so earned is well spent, and so *bene olet;* but most English Churchmen would say *non redolet, sed olet.* If it is spent in the so-called restoration, they cannot be congratulated on the result. Restoration at Stratford means the sweeping away of everything that could have had any connection with Shakespeare: filling the fine windows with poor glass — some quite hideous — and erecting a black-and-white pulpit which is of good workmanship, but is a marvel of expensive ugliness. If the vicar and churchwardens really cannot run the show with more decency, let them confess their weakness and give it up. — *The Building News.*

THE STABILITY OF ST. PAUL'S. — Although alarmist statements made at intervals concerning the safety of the Metropolitan Cathedral must be considerably discounted, it is undoubtedly the fact that engineering operations of a subterranean character are responsible for injury to the foundations, and we are glad to think that no future work of the kind is likely to be permitted in its vicinity without the most careful scrutiny. So far as the present condition of St. Paul's is concerned, it appears from the recent report of two well-known engineers appointed to investigate the matter that the fears entertained by the authorities were by no means unreasonable. The foundations are found to have been impaired by undermining in the neighborhood of the building, and remedial measures are considered to be absolutely necessary. Probably, the large sewer in Carter Lane is the most serious menace to the structure, but the other engineering-works which we have mentioned in previous "Notes" are also responsible for alteration of the original conditions of the subsoil. One unfortunate circumstance is that, while costly repairs are continually required to national monuments, the general public appears to be happily oblivious of the fact that restorative work of the kind means the expenditure of large sums of money that are not always available. — *The Builder.*

A HARD CEMENT. — Frequently it is found that the ordinary plaster-of-Paris or calcium-sulphate cements are not tough enough for the purposes for which they are intended, and the operator is put to considerable trouble to find a suitable substitute. Our German contemporary, *Die Fœber und Zeugdrucker Zeitung*, in a recent article on the subject, states that a mass resembling rich clay, and which will set in about an hour, becoming sufficiently hard to bore, cut or file, may be obtained by mixing six parts of gypsum (sulphate-of-lime) with one part of freshly washed lime. To this, 8 per cent finely powdered marshmallow-root must be added, and the whole mixed with a concentrated solution of sulphate-of-magnesia (commonly known as Epsom-salts) in sufficient quantity to form a stiff paste. In place of the marshmallow-root, dextrin, gum or glue may be substituted, or shellac if the objects to be joined are to be subjected to high temperatures. — *Stone Trades' Journal.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, SEPTEMBER 20, 1902 No. 1395

CONTENTS

SUMMARY: —

The "Fireproof Wood" and Metal-covered Wood Question. — Death of Alexander R. Shepherd, Redeemer of Washington. — Pollution of Chicago's Water-supply. — Projected Reorganization of the Quincy Granite Quarries Co. and the American Bicycle Co. — The Rebuilding of the Tower of St. Mark. — German Insurance against Loss through Strikes. — International Competition for a Church at Patras, Greece. — Tunnelling the Gemmi Pass, Switzerland. 89

NOTES ON IRON AND STEEL CONSTRUCTION. — X. 91

ILLUSTRATIONS: —

A Competitive Design for the Boston Athenæum, Boston, Mass. — Elevation and Section of the Same. — A Competitive Design for the Boston Athenæum, Boston, Mass.

Villa of the Herren Kalmbach, Munich, Bavaria.

Additional: House of Dr. A. Coolidge, No. 487 Commonwealth Ave., Boston, Mass. — House of Thomas Lockwood, Esq., No. 111 Bay State Road, Boston, Mass. — University of Pennsylvania Dormitories, Philadelphia, Pa.: Grotesques; — Arcade to Small Triangle. — Some Entrances: University of Pennsylvania Dormitories, Philadelphia, Pa. — Details: University of Pennsylvania Dormitories, Philadelphia, Pa. . . . 95

COMMUNICATION: —

"When do Building Operations begin?" 95

NOTES AND CLIPPINGS. 95

THE *Engineering News* makes some very sensible comments on the tests of fireproof wood recently made at the Insurance Engineering Experiment Station in Boston. These tests showed that the material so named is very far from being fireproof, and that, at best, it simply ignites more slowly, and goes out sooner, when the source of heat is removed, than untreated wood. The officials of the Experiment Station do not think that these qualities give the fireproof material much superiority over ordinary wood, and it is true that, if a conflagration should start in a building, little difference would probably be observed in behavior between treated and untreated wood; but, as the *Engineering News* well says, a material which does not catch fire easily may be of great use in construction, even though incapable of sustaining intense heat. Mr. Atkinson, in commenting on the report of the Experiment Station, describes the best fireproof door as one of wood, covered with tin. He could not seriously expect the owner of a hotel or office building, dependent for tenants in a great degree upon the appearance of his rooms, to equip it with doors covered with sheets of tin; and the report would probably have met with more favor among those for whose benefit it was intended if it had pointed out that it is not at all necessary to choose between inflammable doors, or wainscoting, and the tin-covered woodwork familiar in boiler-rooms and coal-bins, American enterprise having for some years furnished doors and panelling of wood, completely covered with metal, as neatly and richly moulded as solid woodwork; while several hundred American architects stand ready, whenever called upon, to develop this construction into unheard-of beauties. In fact, the treatment of metal-covered wood fittings of this sort, in bronze or brass, modelled, chased or otherwise ornamented, offers a wide field of beautiful effects, and there is no question that woodwork so protected is, or can be made, quite as fireproof as the ordinary combination of boards and roofing-tin. It would be more expensive, but that is not a very serious matter in costly buildings, and it might be possible to rub a pine door over with black-lead, and electroplate it with copper or brass in a continuous covering, at a comparatively moderate cost.

ONE of the most energetic and most heartily berated men whose activity occupied the attention of the last generation was Alexander R. Shepherd, formerly Governor of the District of Columbia. Soon after the Civil War, Shepherd, then a young plumber in Washington, became conspicuous as a politician, and gradually made his way to the proud title of "Boss." At that time the city of Washington was little more than a filthy swamp, with a few magnificent public buildings scattered about in it. There is a story that some people, during the Civil War, excavating in Pennsylvania Avenue, came across a regiment of soldiers, which had attempted to march up the Avenue, but had been engulfed in the mud. Assistance was summoned, and the soldiers were dug out, but, on being liberated, they besought the workmen to continue their labors, as there was another regiment underneath. Even supposing this tale to be exaggerated, there was plenty of truth in the accounts of the filth and malaria of Washington which were carried North by returning soldiers and officers, and led to a serious movement to have the capital of the nation transferred to some more civilized city. Just at this time President Grant, who loved energy, had occasion to appoint a new Governor of the District of Columbia, and Shepherd, who had been for two years Vice-President of the Board of Public Works of the District, and had introduced various improvements, seemed to him a suitable man for the post. Notwithstanding the opposition of the citizens, he was appointed, and entered at once upon a career of what seemed to the taxpayers wild extravagance. In a little over two years he spent forty million dollars in pavements, sewers, public buildings and other improvements, and saddled upon what was then a town of very small resources a debt of twenty-seven millions. At the end of his term of office he retired under a storm of execrations from the citizens of Washington and from the newspapers of the country, which accused him not only of mad extravagance, but of corruption; few, if any, having the foresight to comprehend the great work which he had accomplished for his native city. The charges of corruption were not sustained, and probably had no foundation. The Governor, on retiring from office, went back quietly to his plumbing business, in which, after some vicissitudes, he saved up a little capital, and went to Mexico, in the interest of some of his friends, who had confidence in his judgment. Joining their resources with his own, he bought the old Batopilas silver mines, and established himself permanently as manager. Under his direction the enterprise prospered, enriching both his friends and himself. Meanwhile, Washington, which had been converted by his energy, and against bitter opposition, from a dull, straggling Southern town into the promise, at least, of a great and splendid city, has begun to fulfil the anticipations which he alone seems to have been capable, thirty years ago, of forming for it, and it may be hoped that among the future attractions of what seems destined to be the most beautiful city in the world, some memorial to the much-maligned Governor Shepherd may not be forgotten.

THE practice of throwing city sewage into a fresh-water lake, and pumping drinking-water out of the same lake, a few miles beyond the sewer outlet, is again producing its legitimate result in Chicago. Although the Chicago River no longer pours its reeking floods into Lake Michigan, but sends them, instead, toward St. Louis, a portion of the sewage of Chicago still finds its way to the Lake, and there, instead of being immediately purified and rendered harmless, is so ill-advised as to creep into the water crib, to be pumped, mixed with drinking-water, into the houses of the city. A week or two ago, there were three hundred and twenty-seven typhoid patients in the County Hospital alone; and the use of the city water has proved so dangerous that the drinking fountains in the schoolhouses have been shut off. Whether anything can be done to remedy the trouble remains to be seen. We may confess that our sympathies are not greatly excited by the failure of schemes for throwing the sewage of great cities into lakes or rivers, to poison people, when it might, instead, be converted, by irrigation, into flour, and beef, and potatoes, and wool to feed and clothe them; but every one must deplore the immediate results of the mistake. Fortunately, Chicago is rich, and enterprising, and intelligent, and it will not look on very long at the decimation of its population by a bad water-supply without devising some remedy.

A CURIOUS distemper has broken out among the "industrial combinations" which, as we are so frequently told, have permanently revolutionized methods of production. A day or two ago, the Quincy Granite Quarries Corporation, formed by the combination of the principal quarrying firms at

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

Quincy, and professing to be the largest producer of granite in the world, defaulted the interest on its bonds. The newspapers explained this circumstance by saying that it was part of a plan for "securing new working capital"; that the business was profitable, but additional working capital was needed, and that, to obtain this, a reorganization was to be effected, under which a large additional issue of bonds was to be made, bearing high interest, and rendered attractive to purchasers by a bonus of new preferred and common stock. Presumably, in order to effect this reorganization, it would be necessary to foreclose the existing bonds, and it might be inferred that the default of interest was made purposely to give occasion for this. Meanwhile, the people who hold common and preferred stock in the present company, which will be cut off by foreclosure, are likely to view the proceedings with a certain interest. Undoubtedly, they will be given the right to take new stock, upon certain terms; but the suggestion naturally presents itself that the holders of the defaulted bonds are legally entitled, if they choose, to sell at auction, under foreclosure, all the assets of the corporation, to satisfy their claim, without troubling themselves about the interests of the preferred and common stockholders; and that, if they have concluded, at present, to give the stockholders a chance of saving some of their property, for the sake of inducing them to subscribe to the increased issue of bonds, there seems to be no reason why the same process should not be repeated wherever new "working capital" is needed.

IT is a little singular that a corporation composed of a number of prosperous concerns should, in a time of general activity, and high prices, need more "working capital," but the same condition of things, it appears, afflicts also the American Bicycle Company, a combination, as we need hardly say, of the principal bicycle manufacturers of the United States, and, in order to obtain the funds which it needs to "carry on" its prosperous business, this corporation has also made default upon its bonded indebtedness, and is, we are told, to be reorganized on the basis of a still larger indebtedness, and still further sacrifice of the value of the stock. Probably, in both these cases, the stockholders are also, in most cases, bondholders, and the reorganization is, practically, a rearrangement of the financial plan of the corporation, perhaps intended only to give the bondholders a larger interest on their property; but it must be confessed that "deals" of this kind, whether in the interest of "insiders" or not, are not likely to attract the public toward investment in either the stock or the bonds of such corporations. Apart from this, however, the fact that industrial combinations, even when prosperous, seem to feel a chronic need of money is of importance. It is said by some manufacturers that the claim put forward in advocacy of industrial combination, that economy and efficiency are promoted by it, is not well founded; and that manufacturing operations are never so economically and efficiently conducted as when they are controlled by one man, thoroughly familiar with all the details of the business. It seems as if there might be reason in this, but if the difference in economy is so great that a combination of establishments, which had each been carried on profitably by one man, is likely to find itself, within a few years after competition has been eliminated by consolidation, unable, even in times of general prosperity, to pay the interest on its mortgage bonds, the student of industrial conditions, as well as the humble investor of his own or other people's savings, would be glad to know more about the matter.

AS we expected, Professor Boni has ascertained that the foundations of the fallen Campanile at Venice are perfectly sound, and that the superstructure can be rebuilt upon them without danger. The cost of rebuilding is now estimated at six hundred thousand dollars, or half the sum which, as the newspapers reported, the Venetian Government thought would be necessary. We are inclined to think that the last estimate is at least twice too high; and, as three hundred thousand dollars are said to have been already subscribed, it is not surprising to hear that the work is to be begun without delay.

A NEW agency in the industrial world has been established in the formation of two companies, one in Germany, and the other in Austria, for insuring manufacturers against loss through strikes. The Austrian company, which seems to have the most radical and comprehensive programme, is to be a mutual one, composed of two hundred and fifty manufacturers, having an annual pay-roll of not less than five million dollars. In case of an "unjustifiable strike" in the establishment of any member of the company, one-half the amount of the regular pay-roll of the establishment will be paid to its owners, out of the reserve fund of the company, so long as the strike continues, if it does not last more than three months; but indemnity will not be paid for more than three months on account of any one strike, nor for more than six months in any one year; the obvious intention of this regulation being to stimulate policy-holders to adjust their labor troubles quickly, and to maintain an attitude toward their employés sufficiently conciliatory to avoid frequent controversies. The indemnity, of half the regular pay-roll, is not intended to reimburse the policy-holder for loss of profits through strikes, but simply to make good to him the outlay necessary to keep his establishment in good order and repair during the cessation of operations. As to what constitutes an "unjustifiable strike," entitling the sufferer from it to indemnity, a few rules are laid down, but the application of them is placed in the hands of an executive committee. A strike of workmen to enforce a demand for the dismissal or employment of any person is classified as being always unjustifiable, and as giving a valid claim to indemnity. In other cases, where "demands have been made which the condition of the business does not justify," or which "threaten the authority of the management," the executive committee makes an examination on the ground, the policy-holder being bound to give full and truthful answers to all questions, and is empowered to endeavor to bring about an understanding between the parties. If it fails, its report decides finally whether the case warrants the payment of indemnity. It is hardly necessary to say that the interest of the company, as well as of its policy-holders collectively, lies in the avoidance or speedy settlement of strikes, so that it is likely to be an important agency in the direction of industrial peace; while its rule, that it will support all its members against coercion by strikes in the matter of employing or dismissing workmen, is likely to take from the hands of the agitators the terrible weapon by which they have for so many years extorted money from their victims, and driven to despair those who ventured to question their authority.

THE American Consul at Patras, Greece, calls the attention of American architects to an international competition for designs for a large church in that city. The church is to accommodate five thousand people, and is not to cost more than two hundred and fifty thousand dollars. Naturally, it is desired that the building should be in the Byzantine style, and it must be designed with a view to resisting earthquakes, which are very common in that part of Greece. The contest is a double one. In the first competition, which closes February 13, 1903, plans, elevations and a perspective view are required, at a small scale, and a certain number of designs will be selected, the authors of which will be invited to submit additional drawings. Five months will be allowed for the preparation of these additional drawings, and, at the end of that time, the competing designs will be submitted to some academy of fine-arts, which will make the final award. In accordance with the award, three prizes will be distributed, varying from four hundred to two thousand dollars.

THE people who have crossed the Gemmi Pass, where an overhanging cliff, fourteen hundred feet high, separates the fair-haired, blue-eyed, German-speaking Protestants of Canton Bern from the dark-haired, French-speaking Catholics of Canton Valais, will be interested to learn that steps are to be immediately taken to construct a tunnel under this pass, from Frutigen, on the north, which is already in railway communication with the Swiss railway system, to Brieg, a station on the Paris, Lyons and Mediterranean Railway, and the terminus of the Simplon tunnel. It is evident that the Swiss, and probably, the Germans also, view with misgivings the progress of the Simplon tunnel, which will throw a vast traffic from Genoa and the rest of Italy over the French lines, and have determined to intercept, if possible, a portion of it, by a tunnel which will connect the Simplon directly with Bern, Basel and the Rhine valley. By a great majority, the people of Canton Bern recently voted to subscribe for one-fourth of the stock of the tunnel railway; and the manufacturers of the region served by it will undoubtedly find the investment a profitable one.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — X.

STEEL-BEAM grillage is the form of foundation-construction shown in Figure 68, and this type of foundation is principally resorted to where the loads to be supported are heavy and the soil is exceedingly plastic. Its use is especially recommended where a thin and compact stratum overlies another of a more yielding nature, and where, in consequence, the allowable height of the foundation is limited, for, if possible, the requisite area for the foundation must be obtained without penetrating the firm strata, and without encroaching too much upon it. The steel-beam grillage type of foundation is especially adapted for tall buildings, and particularly in those buildings in which the entire load is carried on isolated footings or piers — that is, where there is no continuous foundation-wall.

The advantage of this type of footing in such instances exists in the fact that they can be nicely proportioned, so that uniform settlement is ensured; besides, steel-beam grillage affords a foundation which has a minimum height — that is, the distance between the top of the column base and the bottom of the footing is less than in any other type of footing when correctly proportioned. This type of footing also possesses the advantage that it may be readily and rapidly constructed, and at a reasonable cost.

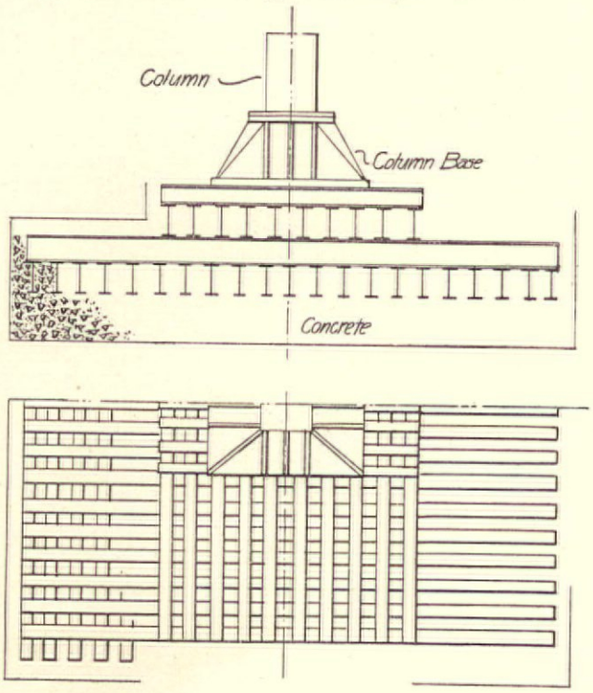


Fig. 68.

Steel-beam grillage footings usually consist of two or more layers of steel I-beams or rails. In constructing this type of foundation a bed of concrete not less than 12 inches thick, composed of 1 part Portland-cement, 2 of sand and 5 of broken stone is first laid; upon this the steel I-beams in the first tier are placed side by side, there being a sufficient number of them to distribute the load over the desired area. These beams are entirely bedded in the concrete by filling between and thoroughly ramming. The second tier of beams, supporting the cast-iron base, is laid across the first layer, reaching to the extreme outer edge; the space between these beams is likewise filled with concrete. Separators must be provided between the I-beams, and the distance between the separators should not exceed 5 feet. The tie-bolts holding the separators in place should pass through the entire tier of beams. The I-beams in each tier should never be spaced closer than 3 inches at the flanges, as a less space would interfere with the ramming of the concrete, neither should the I-beams be spaced at a greater distance apart than 18 inches between centres.

In designing this type of footing the steel beams on the sides and at the ends should be entirely covered with concrete so that they are protected from corrosion. It has been a much disputed question in the minds of engineers whether iron and steel imbedded in concrete possesses durability. From examination of past work it has been thoroughly and conclusively proved that steel or iron when thoroughly imbedded in cement-mortar or in a complete concrete will last indefinitely. Great care should be exercised to prevent initial corrosion from the moisture contained in the concrete before setting; this may be accomplished by thoroughly painting the beams with several coats of a good preservative paint, preferably a mixture of red

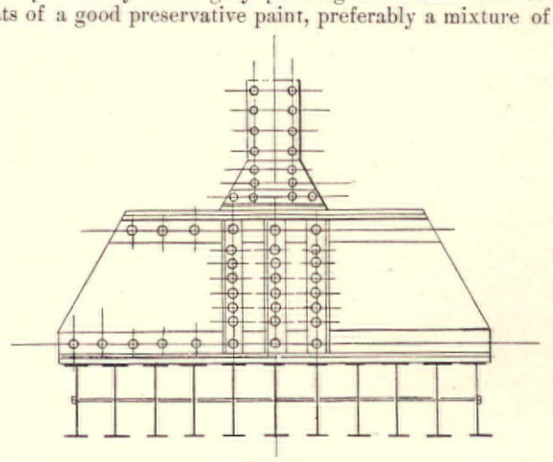


Fig. 69.

and white lead and linseed-oil. Cinder-concrete is not recommended for this type of foundation-construction, for the cinders contain chemical elements which, when united with water, are apt to promote the destruction of the steel. Should the load upon the foundation be so great as to require more beams in the second tier than can be conveniently spanned by the cast-iron base, a third tier of beams may be introduced, or a box-girder as shown in Figure 69 may be used instead of the beams. It is interesting in connection with this type of foundation to note the stipulations of the New York Building Law, which is as follows: —

"Grillage-beams of wrought-iron or steel resting on a proper concrete bed may be used. Such beams must be provided with separators and bolts enclosed and filled solid between with concrete, and of such sizes and so arranged as to transmit with safety the superimposed loads.

"Where metal is incorporated in, or forms part of, a foundation it shall be thoroughly protected from rust by paint, asphaltum, concrete, or by such materials and in such a manner as may be approved by the Commissioner of Buildings.

"When footings of iron or steel for columns are placed below the water-level they shall be similarly coated or enclosed in concrete for preservation against rust."

The principal element in the design of foundations of this kind is the determination of the size of the steel beams. Where the foundation is constructed as shown in the diagrammatic drawing (Fig. 70), there have been two methods proposed by which the size of the beams may be determined. Some engineers figure the bending-moment upon the lower tier of beams to the point c, and in calculating this moment they determine the load per lineal foot sustained by all of the beams in the tier, and multiply the value thus obtained by the *projecting* length of the steel beams, obtaining the bending-moment by multiplying

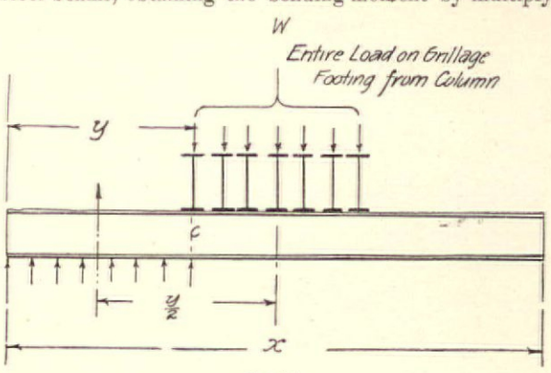


Fig. 70.

the product by one-half the projection of the steel beams composing the tier in question. For instance, let W equal the entire load coming upon the grillage-footing from the column, and let the length of the beams in the lower tier equal x. Then the entire pressure upon the soil will equal $\frac{W}{x}$. The upward force

[1] Continued from No. 1386, page 21.

acting upon the projecting portion of the beams in the lower tier, provided the projection is equal to y, will equal $\frac{Wy}{x}$, and the bending-moment about the point c will, consequently, be expressed by the formula $M = \frac{Wy^2}{2x}$.

Example. — Assume that in Figure 71 the weight W equals 200,000 pounds, and that the projection of the grillage, or y, is

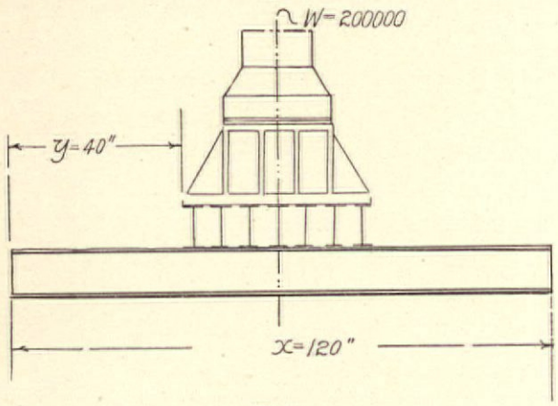


Fig. 71.

equal to 40 inches, while the total length of the beams in the lower tier is equal to 120 inches. By applying the formula $M = \frac{Wy^2}{2x}$ the value of M, upon substitution, is found to equal $\frac{200{,}000 \times 40 \times 40}{2 \times 120}$, or, 1,333,333 inch-pounds. Provided there were 10 beams in the bottom tier, the resisting moment required in each will equal 1,333,333 ÷ 10, or 133,333. If a unit fibre-stress of 18,000 pounds is considered allowable, the section modulus required for each beam will equal 133,333 ÷ 18,000, or 7.4, and 7-inch beams, weighing 15 pounds, would probably be used.

The assumption upon which this formula just demonstrated has been based is that the greatest bending-moment occurs at the point c; this is theoretically incorrect, for the greatest bending-moment on the bottom tier of beams occurs at the centre, or at the point c in Figure 72. Though the advocates of the formula just given claim that the results are amply safe, because the concrete between and around the beams reënforces them and cannot but increase their strength materially, the more conservative practice prefers to consider the greatest theoretical bending-moment, that is, the moment at the centre of the beams in the lower tier. This formula is readily solved by the theory of moments, and their application to the strength of beams, which was treated at length in a previous article.

Referring to Figure 72 let the weight upon the column, or the load transmitted by the upper tier of beams, equal W, and

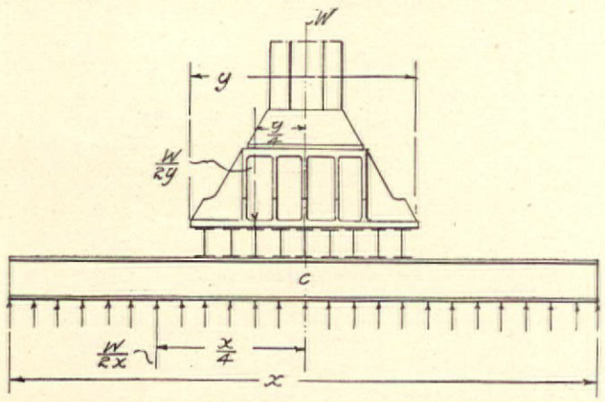


Fig. 72.

let the length of the lower tier of beams, as before, equal x, while the width of the upper tier of beams is equal to y; the upward pressure per inch of length upon the lower tier of beams in the grillage will then equal, as before, $\frac{W}{x}$, and as these forces can be considered as forming a uniformly distributed load, the length of lever-arm of that portion upon one-half of the tier is equal to the distance from the centre-of-gravity of the half-load to the point c, or $\frac{x}{4}$, so that the upward moment of the pressure from the soil upon one-half of the length of the beams in the lower tier of the grillage is equal to $\frac{W}{2x} \times \frac{x}{4}$, or, $\frac{Wx}{8}$; there is opposed to this upward moment a downward moment about the point c equal to $\frac{W}{2y} \times \frac{y}{4}$, or $\frac{Wy}{8}$, so that the algebraic sum of the moments about the point c is equal to $\frac{Wx}{8} - \frac{Wy}{8}$, or $W\frac{(x-y)}{8}$, or, as it is usually expressed, $\frac{1}{8} W (x-y)$. This formula being so commonly used, may be expressed in the following: —

Rule. — The bending-moment upon the beams in the bottom tier of a grillage-footing is found by multiplying one-eighth of the load from the column by the difference between the length of the lower tier and the width of the upper.

Example. — Assume the conditions proposed in the previous problem, in which the load upon the column was 200,000 pounds, the width of the upper tier 40 inches and the length of the beams in the lower tier 120 inches. By substitution in the formula $M = \frac{1}{8} W (x-y)$, the value of M is found to equal $\frac{200{,}000}{8} (120 - 40)$, or 2,000,000 inch-pounds. This, as will be noted from the result previously obtained by the first formula, is considerably greater, which demonstrates conclusively that, theoretically, the greatest bending-moment is at the centre

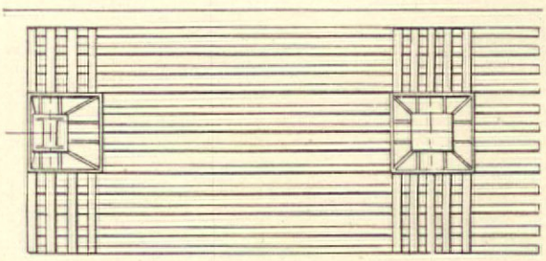


Fig. 73.

of the under tier of beams in the grillage, and not at the edge of the outer tier. In this instance, since the bending-moment is 2,000,000 inch-pounds, and there are ten beams in the tier, the bending-moment upon each beam would equal 200,000 pounds, and if a safe-unit fibre-stress of 18,000 pounds is assumed, the section modulus required for each beam will equal 200,000 ÷ 18,000, or, approximately, 12, and in consequence, there would be required for the lower tier of this footing ten 8-inch I-beams, weighing 18 pounds per foot.

In the design of steel-beam grillage it is often found necessary to support two columns upon one continuous tier of beams. Such construction is usually required on account of the proximity of the columns, and because it is impossible to secure sufficient area by means of a single grillage-footing under the separate columns, and while this construction should never, if possible to avoid, be resorted to, its use oftentimes becomes imperative. The principal difficulty in the design of such a footing as described and shown in Figure 73 exists in the fact that if one of the columns is more heavily loaded than the other, the footing at the end supporting the heaviest load will tend to settle more than at the other. This unequal settlement or tilting is sure to occur when the soil is of a plastic nature, when the variation between the loads of the column is great, and when the footing is made the same width throughout its length. To obviate this difficulty it would seem reasonable to design the footing in the form of a trapezoid, the narrow end of the trapezoid being adjacent to the column supporting the heaviest load. In other words, the centre-of-gravity of the column loads should coincide with the centre-of-gravity of the resultant reaction from the pressure of the soil. Before designing such a footing it is consequently desirable to determine the centre-of-gravity of the loads, assuming that there is a variation between them; in order to determine the distance from one end of the bottom tier of steel beams to the centre-of-gravity of the loads, the following formula can be applied: —

$$D = \frac{(W_1 \times y_1) + (W_2 \times y_2)}{W_1 + W_2}$$

in which D equals the distance from one end of the bottom tier of steel beams to the centre-of-gravity of the loads, W_1 equals the load upon the first column, and W_2 the load upon the second

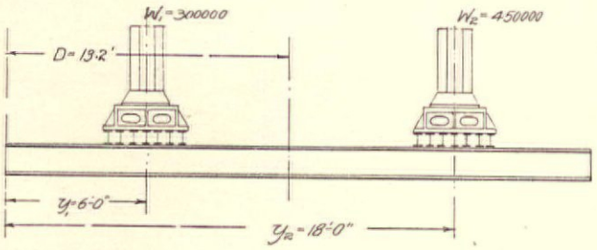


Fig. 74.

column, while y_1 and y_2 equal, respectively, the distances of W and W_2 from the same end of the grillage as D is to be measured. This formula is the same as employed for the determination of the neutral axis, or a line passing through the centre-of-gravity of any section as previously described.

Assume, for example, that the load W_1 in Fig. 74 equals 300,000 pounds, and that the load W_2 equals 450,000 pounds, that the distance y_1 equals 6 feet, and that the distance y_2 equals 18 feet. Then, by substitution, $D = \frac{(300{,}000 \times 6) + (450{,}000 \times 18)}{300{,}000 + 450{,}000}$, or 13.2, and, consequently, the correct form for the area of the footing to partake is a trapezoid, whose centre-of-gravity or neutral axis is at a distance from the small end equal to 13.2 feet.

After the centre-of-gravity of the area for the footing has been located in this manner, and the tier of beams so arranged that the unit pressure from the soil beneath the grillage will be uniform, the bending-moments may be calculated. In the grillage-footing shown in Figure 75, which supports two columns, the greatest bending-moments occur at three points, namely, beneath the respective columns and at some point between them, the bending-moment in each case being at the point of no shear. The loads from the two columns and the pressure of the soil from beneath tend to distort the bottom tier of beams in the grillage by causing them to deflect convexly beneath the columns, and to bend upwards concavely between them. In this system of grillage, as previously stated, it is necessary to locate those points beneath the two columns, and at some point between them, as M_1, M_2 and M_3, at which the shear equals zero.

The unit pressure from the soil upon the bottom tier of beams may be represented by p, while the pressure per unit of length from column W_1 may be represented by p_1, the pressure per unit of length under the column W_2 being represented by p_2. These values p_1 and p_2 are obtained by the following formulas, which are clear upon reference to Figure 75 : —

$$p = \frac{W_1 + W_2}{l}$$

$$p_1 = \frac{W_1}{x_1}$$

while $$p_2 = \frac{W_2}{x_2}$$

When the values of p have been ascertained in this manner, the distances from the left-hand end of the lower tier of beams,

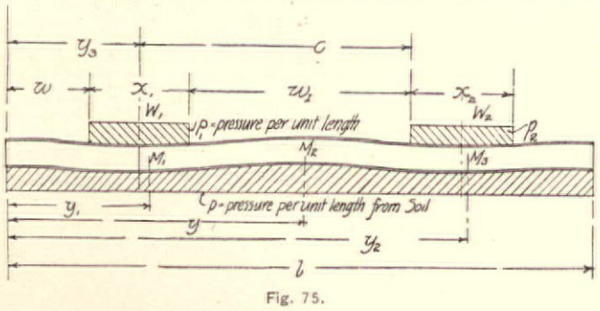


Fig. 75.

to the points at which the shear is equal to zero, may be represented by y_1 and y_2; in obtaining the value y_1 it is true that $y_1 p = p_1(y_1 - w)$, or $y_1 = \frac{w p_1}{p_1 - p}$; in determining the value y it is true that $y p = W_1$, or $y = \frac{W_1}{p}$; in determining the distance y_2 the value $y_2 p = W_1 + [y_2 - (w + x_1 + w_1)] p_2$

$$y_2 = \frac{(w + x + w_1) p_2 - W_1}{p_2 - p}$$

In application of these formulas assume that it is required to determine the three points at which the greatest bending-moments exist, or at which the shear is said to change signs, or to equal zero in the steel-beam grillage-footing shown in Figure 76.

The value to be substituted in the three formulas just given for ascertaining the values y_1, y and y_2 are $W_1 = 300{,}000$; $W_2 = 500{,}000$; $w = 3$; $p_1 = \frac{W_1}{4}$, or 75,000; $p = \frac{W_1 + W_2}{26}$, or 30,769; $p_2 = \frac{W_2}{x_2}$, or 83,333; $x = 4$, and $w_1 = 10$, and the calculation and results of the formulas are as follows: —

$$y_1 = \frac{3 \times 75{,}000}{75{,}000 - 30{,}769}, \text{ or } 5.10 \text{ feet.}$$

$$y = \frac{300{,}000}{30{,}769}, \text{ or } 9.75 \text{ feet.}$$

$$y_2 = \frac{(3 + 4 + 10)\, 83{,}333 - 300{,}000}{83{,}333 - 30{,}769}, \text{ or } 21.24 \text{ feet.}$$

When these several distances from the end of the beam to the point of no shear, or greatest bending-moment, have been obtained in this way the several bending-moments at these points may be obtained by taking the algebraic sum of all the moments about each point. For instance, if all the downward forces are regarded as positive, and all the upward forces are considered as negative, the positive moments at a point y_1 distant from the left-hand end of the grillage or bottom tier of beams of the footing shown in Figure 76 will equal $\frac{p_1 (y_1 - x)^2}{2}$, while the negative moments from the upward pressure of the soil about the same point will equal $\frac{p y_1^2}{2}$; so that the algebraic sum of these moments about the point y_1 distance from the left-hand

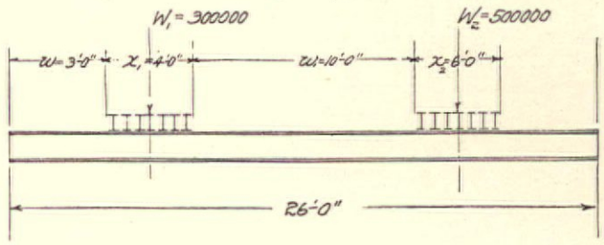


Fig. 76.

end of the tier will equal M_1, or $\frac{P_1 (y_1 - x)^2}{2} - \frac{p y_1^2}{2}$. Regarding, as before, the downward forces as positive and the upward forces as negative, the bending-moment about $M_2 = W_1\left(y_3 - \frac{y}{2}\right)$ for the positive moment about the point in question is equal to $W_1 (y - y_3)$, while the negative moment about the same point is equal to $p y \times \frac{y}{2}$, or $\frac{p y^2}{2}$, so that the algebraic sum of the two values equals $W_1 (y - y_3) - \frac{p y^2}{2}$; but $p y$ must be the same as W_1, for the shear at the point under consideration is zero; that is, the direct downward action is equalized by the direct upward reaction; therefore, by placing the negative value within the parenthesis, and changing the signs, M_2 is found to equal $W_1\left(-y + y_3 + \frac{y}{2}\right)$, or $W_1\left(y_3 - \frac{y}{2}\right)$, which is in form and value the same as given above. In a similar manner, the bending-moment about a point at a distance from the left-hand end of the tier equal to y_2 is found by taking the algebraic sum of the moments about the point. Here the positive moments, or those tending to operate the beam about the left of the point in question in a direction opposite to the moment of the hands of a clock, are equal to $W_1 (y_2 - y_3) + \frac{p_2 (y_2 - y_3 - c)^2}{2}$, while the negative moment about the same point tending to turn the left-hand end of the beam in an upward direction, or with the movement of the hands of a clock, is equal to $\frac{p y_2^2}{2}$, so that the bending-moment about the third and last point, or M_3, equals the algebraic sum of these values, or

$$M_3 = W_1 (y_2 - y_3) + \frac{P_2 (y_2 - y_3 - c)^2}{2} - \frac{P y_2^2}{2}$$

In applying these formulas to the conditions of the problem designated in Figure 76, the several values to be substituted are as follows: as previously found $p = 30{,}769$; $p_1 = 75{,}000$, and $p_2 = 83{,}333$, while, as determined from the condition of the problem stated in the figure, $W_1 = 300{,}000$; $x = 4$; $y = w + \frac{x}{2}$, or 5; and $c = 10 + \frac{x}{2} + \frac{x_2}{2}$, or 15; the values of y_1, y_2 and y_3 being found from the previous calculations to equal, respectively, 5.10, 9.75 and 21.24. Therefore, by substitution in the formulas, $M_1 = \frac{p_1 (y_1 - x)^2}{2} - \frac{p y^2}{2}$, $M_2 = W_1\left(y_3 - \frac{y}{2}\right)$ and $M_3 = W_1 (y_2 - y_3) + \frac{P_2 (y_2 - y_3 - c)^2}{2} - \frac{p y_2^2}{2}$, the values M_1, M_2 and M_3 are determined from the following calculations: —

$$M_1 = \frac{75{,}000\ (5.10 - 4)^2}{2} - \frac{30.769 \times 5.10 \times 5.10}{2}, \text{ or}$$

400,150 foot-pounds.

$$M_2 = 300{,}000\left(5 - \frac{9.75}{2}\right), \text{ or } 39{,}000 \text{ foot-pounds.}$$

$$M_3 = 300{,}000\ (9.75 - 5) + \frac{83{,}333\ (21.24 - 5 - 15)}{2} - \frac{30.769 \times 21.24 \times 21.24}{2}, \text{ or } 5{,}465{,}205$$

or the value in inch-pounds will equal for M_1, 4,801,800; M_2, 468,000; and M_3, 65,582,400.

From these deductions and calculations it will be observed that the greatest bending-moments are at the two end points of no shear, and that the bending-moment at the middle point was comparatively small. This will always be the case unless the column-bearings are an extremely short distance from the end of the grillage, and the maximum bending-moment of these two will usually be under the column-base supporting the heaviest load. When the column-bases are especially designed to sustain the necessary transverse stress, that is, when they are capable of carrying the load on their perim-ters, and when long beams can be used in the upper tier of the grillage, the bending-moments at M_1 and M_3 are reduced to a certain extent, but the value of M_2 remains unchanged.

It is frequently desired that a raft, or grillage-foundation footing, support three columns or bases, instead of two, as described above, and the conditions that lead to such requirements are shown in Figure 77. Here, it is necessary to transmit the pressure on the soil away from the lot-line, so that there will be no interference with the footings under the adjacent building, and in order to accomplish this the exterior column in the basement is set back from the party-line and the upper columns and curtain-wall is supported upon the end of cantilever girders. The principal aim in proportioning such a grillage-footing, as previously stated, is to observe that the centre-of-gravity of the supporting-area of the footing is coincident with the centre-of-gravity of the loads upon the column or base. This desirable result may be secured either by irregularity in the spacing of the columns to suit their respective loads, which is hardly allowable by the designing of the building, and by spreading the

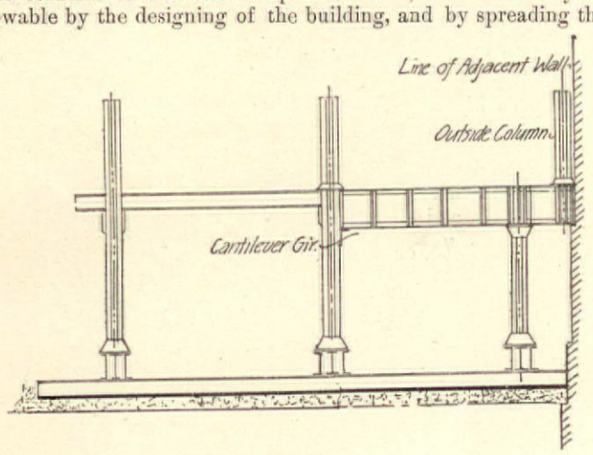


Fig. 77.

grillage at one end and increasing its projection. In order to determine the distance from either end of the centre-of-gravity of the loads upon a three-column grillage, which must coincide as nearly as possible with the centre-of-gravity of the upward reaction of the soil, proceed as follows: multiply the amount of each column or base load by its respective distance from a specific end of the grillage and divide the sum of these moments by the sum of all the column-loads. This rule is more clearly expressed by formula, and if D equal the desired distance upon reference to Figure 78, the amount may be expressed by the formula

$$D = \frac{W_1 y_1 + W_2 y_3 + W_3 y_5}{W_1 + W_2 + W_3}$$

The values as p_1, p_2, p_3 and p, which are the values per unit of length, respectively, for the load W_1, W_2, W_3, and the upward

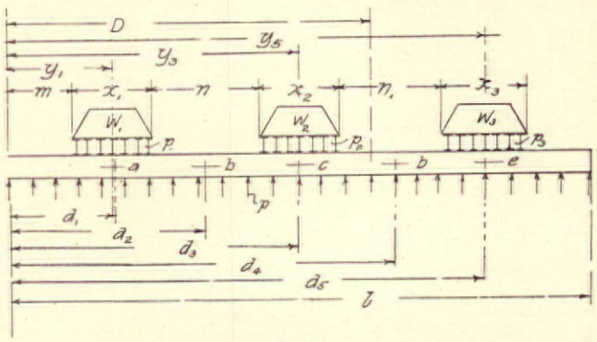


Fig. 78.

pressure of the soil, or $W_1 + W_2 + W_3$, may be expressed by the formula

$$p_1 = \frac{W_1}{x};\ p_2 = \frac{W_2}{x_2};\ p_3 = \frac{W_3}{x_3}$$

while

$$p = \frac{W_1 + W_2 + W_3}{l}$$

The several column-loads and the upward reaction of the soil produce deflection, or, rather, tend to produce, for the beams are held rigidly against flexure by the concrete bed and filling, and, consequently, there is no shear at five points, as at a, b, c, d, e, so that the maximum bending-moments take place at these points. These bending-moments may be conveniently expressed by the letters M_1, M_2, M_3, M_4, M_5, signifying the moments at the first, second, third, etc., position from the left-hand end of the grillage.

Before the bending-moments can be calculated, however, it is necessary to determine their position from one end or the other of the beam, and this may be done by equating the amount of pressure from the soil beneath the beam, included in the distance from the end to the point which it is desired to locate, with the downward pressure due to the several loads acting upon the top of the beams included in the same length of beam or grillage. For instance, the upward reaction due to the pressure of the soil beneath the grillage from the left-hand end of the beam to a point at d_1 distant from the left-hand end of the beam is equal to $p\,d_1$; the reaction from the soil from beneath the grillage to a point at d_2 distant from the left-hand end of the beams is equal to $d_2\,p$; likewise the upward pressure to a point d_3 distant from the left-hand end of the grillage is expressed by $d_3\,p$, while in the same way the upward pressure from the end of the beam to a point distant d_4 equals $d_4\,p$, etc.; in order, therefore, that the vertical shear upon the grillage shall equal zero at the points a, b, c, d, e, in Figure 78, or at the points of greatest bending-moment represented by M_1, M_2, M_3, M_4, M_5, there must be at each point d_1, d_2, d_3, etc, distant from the left-hand end a downward pressure in opposition and equal to $d_1 p$, $d_2 p$, $d_3 p$, etc.; this downward pressure at d_1 will equal a portion of the load W_1; at d_2 it will include all of the load W_1, while at d_3 it will include the entire load of W_1 and a portion of the load W_3; the downward pressure at the point d_4 being likewise equal to the entire load W_1 and W_2. From this it will be quite evident that the following equations may be correctly deduced: —

$$d_1 p = (d_1 - m) \times p_1, \text{ or } d_1 = \frac{m p_1}{p_1 - p}$$

$$d_2 p = W_1, \text{ or } d_2 = \frac{W_1}{p}$$

$$d_3 p = W_1 + [d_1 - (m + x_1 + n)]\, p_2, \text{ or}$$

$$d_3 = (m + x_1 + n) \times \frac{p_2 - W_1}{p_2 - p}$$

$$d_4 p = W_1 + W_2, \text{ or } d_4 = \frac{W_1 + W_2}{p}$$

$$d_5 p = W_1 + W_2 + [d_5 - (m + x_1 + n + x_2 + n_1)]\, p_3, \text{ or}$$

$$d_5 = \frac{(m + x_1 + n + x_2 + n_1) \times p_3 - W_1 - W_2}{p_3 - p}$$

When these several distances have been ascertained, the negative and positive moments about each of these points, the location of which is found, may be calculated, and their algebraic sum will equal the bending-moment at the five points where it reaches the maximum throughout the girder. In determining the formulas for the bending-moment it should be observed that in figuring the moment of any uniformly distributed load the length of its lever-arm is considered from the centre-of-moments to the centre-of-gravity of the load. For instance, in a cantilever supporting a uniformly distributed load of W upon a length equal to l, the lever-arm by which the moment is created at the point of support is equal to $\frac{l}{2}$, and the bending-moment at the same point is $\frac{Wl}{2}$. Referring to Figure 78, the positive moments at M_1, M_2, M_3, M_4 and M_5 are respectively equal to $\frac{p\,d_1^2}{2}$, $\frac{p\,d_2^2}{2}$, $\frac{p\,d_3^2}{2}$, $\frac{p\,d_4^2}{2}$ and $\frac{p\,d_5^2}{2}$, while the negative moments about the same points are equal, respectively, to $\frac{p\,(d_1-m)^2}{2}$, $W\,(d_2-d_1)$, $\frac{p_2\,(d_3-m+x_1+n)^2}{2}+W_1\,(d_3-d_1)$, $W_1(d_4-d_1)+W_2\,(d_4-d_3)$ and $\frac{p_2\,(d_5-m+x_1+n+x_2+n_1)^2}{2}$ $W_1\,(d_5-d_1)+W_2\,(d_5-d_3)$, and by combining the two sets of values the following equations for the bending-moments are obtained: —

$$M=\frac{p\,d_1^2}{2}-\frac{p\,(d_1-m)^2}{2}$$

$$M_2=\frac{p\,d_2^2}{2}-W_1\,(d_2-d_1)\;W_1\,b-W_1\,\frac{d_2}{2}=W_1\left(b-\frac{d_2}{2}\right)$$

$$M_3=\frac{p\,d_3^2}{2}-\frac{p_2\,(d_3-m+x_1+n)^2}{2}+W_1\,(d_3-d_1)$$

$$M_4=\frac{p\,d_4^2}{2}-W_1\,(d_4-d_1)+W_2\,(d_4-d_3)$$

$$M_5=\frac{p\,d_5^2}{2}-\frac{p_3(d_5-m+x_1+n+x_2+n_1)^2}{2}$$
$$+W_1\,(d_5-d_1)+W_2\,(d_5-d_3)$$

Usually in this style of grillage footing the bending-moments at M_2 and M_4 will be small and the maximum bending-moment will be at one or the other of the points M_1, M_2, or M_3, depending upon which point supports the greatest column-load.

In the several solutions for the bending-moment given, the upward reaction of the soil was considered as of uniform intensity and not of varying pressure, as would exist were there any deflections in the beams and concrete forming the footing. Such deflection is not likely to occur when it is considered that the beams are thoroughly embedded in the concrete and are greatly stiffened thereby.

In the next article, the design of spread footings, armored concrete or of the Melan construction will be considered, and a comparison of cost between such footings and the steel-beam grillage summarized.

M. M. Sloan.

[To be continued.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, BOSTON, MASS. MESSRS. RANKIN & KELLOGG, ARCHITECTS, PHILADELPHIA, PA.

It is understood that this design was held by the jury deserving of second place.

ELEVATION AND SECTION OF THE SAME.

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, BOSTON, MASS. MR. A. W. LONGFELLOW, ARCHITECT, BOSTON, MASS.

[The following named illustration may be found by reference to our advertising pages.]

VILLA OF THE HERREN KALMBACH, MUNICH, BAVARIA. HERR E. DROLLINGER, ARCHITECT.

This plate is copied from *Architektonische Rundschau*.

[Additional illustrations in the International Edition.]

HOUSE OF DR. A. COOLIDGE, NO. 487 COMMONWEALTH AVE., BOSTON, MASS. MR. R. C. STURGIS, ARCHITECT, BOSTON, MASS.

In our issue for August 23d last we published a view of the adjoining house, also designed by Mr. Sturgis, and ascribed the ownership to Dr. A. Coolidge, whereas it should have been ascribed to Dr. George Haven.

HOUSE OF THOMAS LOCKWOOD, ESQ., NO. 111 BAY STATE ROAD, BOSTON, MASS. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA.: GROTESQUES; — ARCADE TO SMALL TRIANGLE. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

SOME ENTRANCES: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

DETAILS: UNIVERSITY OF PENNSYLVANIA DORMITORIES, PHILADELPHIA, PA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

Correction. — We had the misfortune in our last issue to deprive Messrs. Stickney & Austin, architects, of Boston, of the authorship of the design of the house of Ex-mayor E. U. Curtis, on the Bay State Road, by wrongfully attaching to the illustration of the doorway of the house the names of Messrs. Winslow & Bigelow as architects.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"WHEN DO BUILDING OPERATIONS BEGIN?"

Boston, Mass., September 16, 1902.

To the Editors of the American Architect: —

Dear Sirs, — Your correspondent Mr. Cervin inquires what constitutes the first beginning of work on a building or wall. About ten years ago a new building-law went into effect in Boston which materially changed some of the existing provisions in regard to construction. I was at that time engaged upon the construction of a large office-building, permit for which had been granted some time before the law went into effect, but I was notified by the Building Department that the City Solicitor had decided that for a building to have been begun it was not sufficient for the excavation to have been made, but that some of the actual permanent construction of the building must be in place. This is one decision that might fix the point upon which your correspondent inquires.

Yours very truly, C. H. Blackall.

NOTES AND CLIPPINGS

Scotch Gardens. — Scotland has many good gardens. The Duchess of Sutherland cares much for her garden at Dunrobin Castle. Owing to the mild climate and rich soil of this corner of Scotland, the Dunrobin gardens seem at their best in the earliest spring, when the millions of snowdrops are in full bloom. At Glamis Castle, the chief feature is a famous sundial. It stands on the lawn, has 84 dials, and is supported by lions carved in stone. One hardly expects to find a garden on the lines of Versailles in the heart of Scotland; but such can be seen at Hopetoun House, belonging to Lord Hopetoun. Gray, the poet, praised these beautiful, if somewhat formal, parterres; and Byron observed that "such symmetry was not for solitude." Terraced gardens are approved in Scotland; they are seen at Balcarres House, belonging to Lord Crawford, and are a feature at Drumlanrig, the princely domain of the Duke of Buccleuch. — *Illustrated Carpenter and Builder.*

Early Hours. — Builders will be gratified by the decision which was given in the Court of Appeal on Tuesday last. An enlargement of Harrod's Stores is in progress, and, as is usual in all works of importance where expedition is essential, a steam crane is employed. Some of the residents in the neighborhood applied for an injunction to restrain the crane from operating as early as 6.30 A. M. Mr. Justice Buckley granted an injunction which would prevent the use of the crane before 7 A. M. The defendants appealed on the ground that they would suffer a serious penalty, as they would be paying a large number of men for half an hour in which no work could be executed. Lord Justice Vaughan Williams stated that the Court could not say that it was unreasonable to begin using a crane at 6.30 A. M. There was no vested right which secured people living in a residential street from being disturbed before 8 A. M. It was to the interest of every one to have the work executed as quickly as possible. He thought that the

injunction ought to be discharged. Lord Justice Mathew agreed, and was of opinion there was no ground for the application or for the injunction. — *The Architect.*

Tripartite Stroke of Lightning. — A correspondent of *Nature* writes as follows concerning a tripartite stroke of lightning in Cambridgeshire, England: "At 6 50 P. M. on August 7, after two or three preliminary low thunder rumblings, which by no means prepared us for what was to come, a most tremendous crash of combined thunder, lightning and electric discharge burst right over my residence here. My butler, who was looking in the direction of our front gate, 80 yards to the north of our front door, saw a burst of smoke, mingled with a shower of leaves, rise into the air out of the adjoining shrubbery. My coachman, who was sitting just within the open door of the lodge, close to the front gate, was dazed by a vivid burst of flame at his feet which seemed to leap into the doorway. My neighbor's gardener, looking out of the lodge opposite, saw a nearly horizontal flash of fire enter the shrubbery close to my front gate. A subsequent examination of the surroundings of the front gate and my coachman's lodge has revealed: (1) A tearing-up of the ground close to the massive iron post of the front gate, the splitting of a large flint at its foot, and a litter of ivy-leaves on the gravel. (2) The clean cutting in two of an oak post, 35 yards distant to the northeast, from which an iron hand-gate was hanging. (3) The scorching of the outside foliage of a horse-chestnut some 15 yards still farther off, in a direct line with the other two objects struck. In thirty years' experience of thunder-storms, which are rather frequent here, I have never observed the simultaneous striking of three different points by the electric discharge. A deathlike stillness succeeded the crash, the storm appearing to have exhausted itself in a single tremendous explosion. Heavy rain was falling when the crash occurred."

The Roman Monument to Victor Emmanuel. — The architect of the great monument to Victor Emmanuel, the "Father of his Country," has publicly announced that the work has lately taken such strides that it will be finished in seven years. This, added to the thirty-odd years since the monument was begun, seems a tremendous time, to modern ideas, especially as the money was forthcoming from the first. This impatience is, however, reproved by the ancient buildings surrounding the great work, many of which were hundreds of years in the building. The new monument stands at the extreme end of the historic Corso, which before closed in a medley of odd buildings. Many of these have already been torn down to make the necessary space, and others are in process of demolition, so that the colossal monument will have in front the stretch of the Corso to the Piazza del Popolo on one hand, the Capitol and the Church of the Ara Cœli, with their majestic sweep of steps, and on the other Trajan's Forum, with its unrivalled storm beaten column and the twin churches at its northern end. The monument will be a grandiose building of porticos, Corinthian columns, statues and bas-reliefs, which will house two or more museums, and perhaps a library, surmounted by a magnificent triumphal group of horses and chariot driven by "Victory," the whole rising about 290 feet. In front, standing well out from the building, on its own pedestal and approached by steps, will be an equestrian statue of the Re Galantuomo. The taste of the whole has by some critics been seriously questioned, if not condemned, but no one can deny that the effect at the end of the Corso, the centre of the life of the city, will be stupendous. — *Pall-Mall Gazette.*

London's vast Problems. — The report of the London County Council published this week furnishes some striking figures indicating the immensity of the municipal problem with which the London authorities are confronted. According to the census of 1901, the population of the Administrative County of London was 4,536,541, while Greater London, immediately surrounding the County, showed an additional population of 6,500,000. The lunacy statistics of the Administrative County show an increase of 50 per cent in the last ten years, the total number of lunatics being 21,369, for which drink and business and domestic troubles were accounted to be largely responsible. The London County Council has to maintain 2,017 miles of paving, a large section of which is in a constant state of upheaval, owing to the number of gas, electric and water companies having the power to open roadways. The problem of housing the working-people is dealt with on a large scale, the Council acting as landlord to a population of 12,596 housed in cottages, block dwellings and various other structures. The year's working showed a net surplus of $11,565 for these dwellings compared with a deficit of $5,785 for the previous year. The Council is a large owner of omnibus and street-car lines, which carried last year over 118,000,000 passengers, while all the omnibus lines of Greater London showed the enormous total of 530,000,000 passengers. The city's debt statistics show a discouraging increase, the total debt outstanding being $231,344,355, equivalent to 124.98 per cent of the ratable value, against 104 64 per cent when the London County Council came into existence. The tax-rate now amounts to about 36½ cents per pound sterling ($5). — *N. Y. Tribune.*

Studios for poor Paris Artists. — Alfred Boucher, an artist, is making a novel effort to help less fortunate fellow-craftsmen. From various architectural fragments and waste material from minor exposition buildings he has constructed, in the Vaugirard Quarter, Paris, a large domed building providing 48 studios and a common hall. These are to be rented to painters and sculptors for prices ranging from $30 to $50 a year, the latter sum providing sufficient room for living quarters. The privileges of the common room, with special arrangements for art-work, and free instruction by M. Boucher, are to cost but $10 a year. A building close by is to serve as a museum for art-works owned by M. Boucher, who has also lavishly decorated the corridors of the studio building with paintings. — *Success.*

The Wane of the Lightning-rod. — The day of the lightning-rod is passing, says the New York *Evening Post.* The Government's latest census returns show that Franklin's invention for protecting the house is little used to-day. No electrical-manufacturing establishment reports it among the products, and so far as the census expert has been able to learn, only one American electrical-engineering firm makes a business of setting-up the rods or designing them. So far as large cities are concerned, disastrous lightning-strokes are reported to be more rare, and the decrease is accounted for by the network of electrically charged wires and other apparatus with which the city is now interwoven and surrounded.

Bort. — The only place in the world where that form of carbon known as the black diamond, or bort, is found in marketable quantities is in Bahia, in South America. The substance is used for points for stone drills and saws, and is powdered and used to polish diamonds and other precious stones. There is a wide and growing demand for it. The black diamond is found with the ordinary diamonds in the Bahia fields and brings about ten dollars a carat. The largest carbon ever found weighed 3,150; it was bought from the miner for $16,000; was afterward purchased for $25,000; and was sent to Paris, where it was broken up and sold to the trade. The average size is about six carats. The annual output is decreasing as the demand grows larger, and the price is mounting. It is probably only a question of time when a black-diamond combination will be formed to work the small area with modern machinery. The present methods are very primitive. — *Exchange.*

The Days of the Dalziels. — The death of Mr. George Dalziel, which has just occurred at Hampstead, in his eighty-seventh year, carries the mind back to the great period of English illustration that began in the sixties, when, under the influence of the work of Adolph Menzel, so many famous artists were filling the pages of periodicals with beautiful drawings. There were two firms of engravers which were specially connected with this period — the firm of Dalziel Brothers and the firm of Swain. George Dalziel (says the London *Times*) came to London first of the three brothers, whose lives and work found interesting record in a book about them published last year. They were the sons of a Northumbrian artist, and were all men of more than ordinary culture and talent. They certainly raised wood-engraving to the highest pitch of art it has ever reached in this country. The mechanical methods of photography and process-engraving have now almost entirely superseded the wood-engraver, and such wood-engraving as there is does not deserve much notice. But there remain in the old volumes of *Once a Week, Good Words,* the *Cornhill Magazine* and other periodicals, as well as in the books issued by the Dalziels, ample evidence to justify the remark of Mr. Pennell that "the day is coming when the books issued between 1860 and 1870 in England will be sought for and treasured up, when the few original drawings that are still in existence will be striven for by collectors, as they struggle for Rembrandt's etchings to-day." The names of the Dalziels are not likely, therefore, to be forgotten.

The Growth of Vienna. — The boundaries of Vienna are to be again widened, and this time to such an extent that the area of the Austrian capital will be almost doubled, and will be second to that of London alone in Europe. Vienna, though it is called the Imperial City on the Blue Danube, lies, as a matter of fact, only on the right bank of that river, which forms its boundary on the northwest. A large semicircle on the left bank, embracing the manufacturing town of Floridsdorf and eleven other places, with a total area of 154 square kilometres, is now to be added to Vienna, and will raise its area from 178 to 332 square kilometres. The new districts, however, are so thinly populated that they will add only 58,000 persons to the population of Vienna, raising it to about 1,800,000. The object of including so large a tract, chiefly rural in character, and much of it liable to periodical floods, is connected with the impending construction of the Danube-Oder Canal, which will enter the Danube opposite the town and within the new district. It is expected that it will create a large industrial quarter there. The old bed of the Danube, through which the river used to flow before its canalization, will be converted into docks and harbors. As all the towns and villages concerned have signified their readiness to fall in with the scheme, and a majority in the town is in favor of it, there is little doubt that the project will shortly be carried into effect, possibly in the course of this summer. — *Illustrated Carpenter and Builder.*

Artesian-well Power. — Mr. W. E. W. Yerby, of Greensboro, Ala., writes to the *Scientific American* to say that "there is in this [Hale] county an artesian well 10 inches in diameter that throws out a volume of water sufficient to run a grist-mill, cotton-ginnery and cotton-press and a saw-mill. The well is about 600 feet deep, and was bored fifty years ago by Col. Samuel Pickens on the plantation 12 miles southwest of Greensboro, Ala., known as the 'Goodrum Place,' now owned by Lee M. Otts, Esq. The water comes up with such force from the well that a silver dollar thrown into its mouth will not sink, but will be thrown out. The gusher has diminished very little in the amount of water furnished during the half century it has been running. To give an idea of the amount of water that is thrown from the well, I will state that the trough surrounding it is 4 feet across, and when the water falls back it comes near filling the trough from side to side. The mill and ginnery run by the water from this well is situated on a hill-side about a hundred yards away, and the water is carried to it by means of a canal cut in the solid lime rock. Just under the mill-house is a well 3 feet across and 40 feet deep. In this well, at a depth of 25 feet, is a turbine wheel, and the water from the canal is turned on it when it is desired to run the machinery. A tunnel from the bottom of this 40-foot well has been cut a distance of 100 yards — ranging upward — and empties the waste-water from the mill into a branch."

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVII SATURDAY, SEPTEMBER 27, 1902 No. 1396

CONTENTS

SUMMARY: —

Topical Architecture. — The Anthracite Coal Strike. — Projected Enlargement of the United States Capitol. — More Facts connected with the Westinghouse Building Operations in England. — The Newspaper Artists' Exhibition in Boston. — The Competitive Designs for the Franz Joseph Museum, Vienna. 97

WIRE-GLASS WINDOWS. 99

LETTER FROM CHICAGO. 100

PRUSSIAN BILL-POSTING REGULATIONS. 101

THE LAST RESTING-PLACE OF THE ANGEVIN KINGS. 101

ILLUSTRATIONS: —

United States Custom-house and Post-office, Newport News, Va. — United States Post-office, Anniston, Ala. — A Competitive Design for the Carnegie Library, Burlington, Vt. — Elevation and Plan: Land Title Building, Philadelphia, Pa. — Proposed Hotel, Bowdoin St., Boston, Mass.

Pan-American Exposition, Buffalo, N. Y.: Main Entrance: Electricity Building; — Main Entrance: Machinery and Transportation Building.

Additional: The Library: House of Charles M. Gilman, Esq., Southport, Conn. — Fireplace in the same Room. — Monument erected by the Salesian Fathers overlooking the Bay of Rio di Janeiro, Brazil. — Land Title Building, Philadelphia, Pa. — "The Flat-iron," from the Southeast, 22d Street and Broadway, New York, N. Y. — "The Flat-iron," 23d Street and Broadway, New York, N. Y. 103

COMMUNICATION: —

Metal-covered Wooden Finish. 103

NOTES AND CLIPPINGS. 104

WE desire to say to subscribers whose orders for back issues of *Topical Architecture* we have not yet filled that the delay and annoyance is only temporary. The reprinting of the many issues of this popular periodical that are already out of print is proceeding with as little delay as possible.

THE coal-strike is furnishing some lessons in regard to the effects of union tyranny upon the workmen themselves which, we hope, will not be lost. It seems that, in most anthracite mines, a piecework system is in use, by which the miners are paid by the carload of coal taken by them from the mine, the car used for a measure being a small affair run by hand through the galleries of the mine. Very high prices are paid for this work, so that it would be easy for a moderately active man to earn from five to seven dollars a day, if it were not for the unions, which prohibit their members, and, of course, prevent any one else, from getting out more than six carloads of coal a day. This takes, on an average, five hours, and the miners are forbidden by the unions, under penalty of expulsion, to do any work at their trade during the remaining nineteen hours. Some of the men are too ambitious to spend nineteen hours out of every twenty-four in idleness, and pick up what work they can, that will not attract the unfavorable notice of the unions, after they leave the mine for the day. One man, for example, easily loads his six cars, earning three dollars and a half by so doing, in the morning, and spends his afternoon in doing jobs of gardening in the neighborhood of the mine, at fifteen cents an hour; while others find outside employment in similar ways. One miner, who had been put to heavy expense by sickness in his family, begged of the union, as a favor, permission to get out for a time a little more than the regular six cars of coal, so that he might make up his losses gradually by his extra earnings. Permission was refused; but the poor man worked surreptitiously a little harder than usual, hoping that his efforts on behalf of his family would not be discovered. They were, however, soon betrayed, and the victim was warned, by having the rails on which his car ran repeatedly torn up, so that the coal could not be got out, that the necessities of his family were nothing to his tyrants.

THE inexperienced reader might ask what object an association, professedly formed in the interest of a certain class of workingmen, could have in limiting the income of its members to one-half what they would receive if it did not interfere. The answer is the same as that which must be given to a great many questions in regard to labor unions, that these organizations are, to a great extent, controlled by men who have not a single idea or interest in common with the workingmen whom they assume to represent, but who use them as cat's-paws to gain for themselves money or political power, and that these schemers gain control of the unions through the laziest and most worthless of the members, whose only chance of getting employment at their trade lies in suppressing or degrading in some way the men better than themselves. It is obvious that if the good men can be prevented from doing more than five hours' work a day, the coal-operators, who have to get out a certain amount of coal to fulfil their contracts, must hire an additional force of inferior ones to make up the amount; and that, in this way, instead, let us say, of fifty good men doing all the work of a mine, the fifty good men, compelled to lie idle half the day, must be supplemented by an indefinite further number of inferior men. This means, of course, that the latter virtually ride through life on the backs of their more intelligent comrades, and it is by no means in the coal-mining industry alone that workingmen's unions are managed in this way, and, as is boldly avowed, for this purpose.

IT might be well for those who read that fourteen dollars a ton is bid for anthracite coal in the Philadelphia market, and who look with anxious apprehension on the dwindling remnant of coal in their own bins, to remember that their troubles are due, not to combinations of capitalists, but to Mr. Mitchell, who, trusting to the public distress to aid his schemes, has taken advantage of a bad system, brought to dangerous power by the support of politicians, to make demands which cannot be granted without abandoning the free workingmen of the anthracite region of Pennsylvania to a greedy and remorseless despotism, and the granting of any portion of which would simply benefit Mr. Mitchell himself, and his confederate politicians, at the expense of the poor householders of the United States. Much as we may dislike trusts, monopolies and coercion of all kinds, it is plain that, in the present case, the mine-operators are fighting the battle of American liberty, and should be supported by all who still believe in that liberty.

AT the same time, it is possible that a good deal can be done by legislation to relieve the general distress, not by "compelling" the coal-operators to grant Mr. Mitchell's demands, a proceeding which would simply lead to more exorbitant demands, but by taking off the import duty on all coal so that Welsh coal can be imported and sold in this country. With the duty removed Welsh coal, at present prices in Wales, could be delivered in any city east of the Rocky Mountains for from six to seven dollars a ton, and, in the coast cities, perhaps for a little less. An act of Congress, which could be passed, signed and put in execution within a few hours after the assembling of Congress on the second of December, would give the needed relief to millions of humble households; and a popular movement in favor of this would be far more likely to succeed, and far more in harmony with American ideas of individual liberty, than the agitation, started and kept up by designing politicians, about "compulsory" legislation in Pennsylvania. It may be observed, however, that if the Legislature of Pennsylvania really wished to end the coal-strike, or if it could be brought to that state of mind by the pressure of public opinion, it could accomplish that end very quickly by the repeal of the statute prohibiting any one from working as a miner in the anthracite region who has not already been employed for two years in an anthracite mine, and is not registered in certain books kept for the purpose. This statute, in all probability, never had any object except to encourage and prolong strikes in anthracite mines, by making it impossible for the operators to employ outside help; and its repeal would open the doors of the mines to multitudes of free and capable men, at the same time that, by removing from the business of anthracite mining the heavy hand of legislative and union tyranny, it would at once restore to the rest of the community the steady and uninterrupted supply of one of the chief necessaries of life.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

AS usual, it is the patient and enduring public which, in the end, suffers most from this tyranny. Supposing, let us say, that the anthracite miners were free to earn as much as they wished, it is probable that each man employed would eagerly seize the opportunity to get out twice as much coal as the union rules now permit, receiving twice as much pay as he is now allowed to earn. This would leave the cost, for miners' labor, of getting out the coal the same as it now is, but the incidental expenses, such as pumping, hoisting, transportation, salaries, interest and dividends would be only half as much, per ton of coal, as they now are, for the reason that these go on just the same whether the miners are working or not; and if the miners brought down twice as much coal in a day, the incidental expenses would be divided among twice as many tons. These incidental expenses form the largest part of the cost of the coal, so that every family that uses hard coal pays a considerable portion of its cost as a consequence of this system. Supposing that the extra cost of anthracite coal due to the union rule of keeping the miners idle half their time, while all the other expenses of mining continue, to be only ten cents a ton, which is probably far within the truth, the tax which the consumers, nearly all of whom are poor and hard-working people, are compelled to pay to support the tyranny of the miners' union, is, in normal times, a hundred thousand dollars a week; or, in other words, if the anthracite miners enjoyed anything like the liberty which the Constitution of the United States guarantees to every citizen, they would not only be much richer than they now are, but their fellow-citizens would have a hundred thousand dollars a week to apply to family expenses which many of them find it difficult to provide for.

THE *Scientific American* asserts without reservation that the Capitol at Washington is soon to be extended, on the east side, by the addition of a mass of building, connecting the present wings, and entirely covering the old sandstone front between the wings, which will be visible only in the courtyards. It seems that the late Dr. Walter, the architect of the dome and of the wings, left plans for such an extension as is now contemplated, which are to be carried out substantially as he left them, some changes only being made in the arrangement of the rooms. We need not say what a relief it is to hear no more of the "pylons" and such things, which have so often been said to be in contemplation for the "improvement" of the Capitol, and it will certainly be an advantage to have the sandstone portion covered up with marble like the material of the wings. Dr. Walter's design for the new middle portion suits admirably the noble, almost romantic, dignity of the wings, besides adding much to the effect of the dome; and the profession will be glad to see it carried out.

ONE of the engineers of the new buildings erected in England for the Westinghouse Company gives his experience in an interesting paper in the *Journal of the Western Society of Engineers*. It will be remembered that the Westinghouse Company, having occasion to build an important group of factories in England, applied to English contractors, who agreed that it would take five years to carry out the plans submitted to them; and that the Westinghouse Company then contracted with an American firm of builders to do the work. Mr. Sloan, the author of the paper, was engaged as engineer by the contracting firm, and spent a year and a half in his duties in England. On the arrival of Mr. Stewart, the American contractor, he found a clerk-of-works, with about a dozen assistants, installed in little offices in different parts of the ground. These superintendents arrived at their offices at about nine o'clock in the morning, and went home about five. Mr. Stewart requested them to present themselves every day when work began, and to stay until it ended, and this reasonable request, as we should think, was answered by the resignation of about half of them, one man saying, in his letter of resignation, that "a man cannot be a gentleman and work under the American administration." Mr. Stewart, however, cared more for efficient superintendents than for gentlemen, if he could not have both, and the places of the retiring men were soon filled.

AMONG the workmen a curious custom prevailed. The men began work at seven o'clock in the morning, but at half-past eight they all stopped for half an hour to take their "breakfast," which consisted of bread and tea. The latter had to be warmed, so the men built little fires on the ground for the purpose. Nominally, the time consumed in this occupation was half an hour, but the interruption of work, including the delays incident to getting started again, was much more than this, and, as three thousand men were often at work at once, the loss of time was a serious matter. Mr. Stewart began by setting up a water-heater on the grounds, from which hot water could be obtained at any time, and forbidding the lighting of any other fires; and the example of the Americans seems also to have inspired the men to a certain extent, for the different trades, one by one, abandoned their morning tea, the bricklayers being the only men who held out to the end. For these, however, other surprises were in preparation. We have before described the process, by placing inspectors over the men, and reporting every day the number of bricks laid by each, by which the average number was raised in a few weeks from about four hundred to nine hundred; and how, as the work became better organized, and the energy of the men was aroused, this average was raised to more than nineteen hundred; but Mr. Sloan gives some interesting particulars of the methods by which this revolution was effected, one being the provision of suitable hoists for material, and another the use of a thinner mortar than that commonly employed in England, saving some labor in spreading, and in setting the bricks. The greatest effect was, however, produced by selecting and keeping the most skilful and active men, which was accomplished by paying more than the union rate of wages, which, in England, is only twenty cents an hour for bricklayers. Notwithstanding this low rate of wages in England, Mr. Sloan says that contracting-prices of doing work generally are "away above those of doing corresponding work in this country"; the difference being due to the "slack method of handling work"; and he thinks that the "slackness" is quite as much on the part of the managers as of the men. As he sensibly says, their own experience showed what English workmen can do with suitable encouragement, but no men will do their best under inefficient management.

THE exhibition of drawings held in Boston this week by the Newspaper Artists' Association was a rather interesting place to visit, although the visitors must have had on leaving a good deal of that sensation of indigestion with which one takes up or lays down the Sunday edition of a Metropolitan newspaper. From a technical standpoint the drawings were far more interesting than we had expected to find them, but the walls were so overloaded and the drawings so poorly arranged that the pleasure of seeing occasional examples of really excellent drawing and delicate coloring was sure to be marred by having to half see at the same time objectionable neighbors on the wall. As most of the drawings were evidently made for weekly publications and Sunday papers of the better class they did not wholly typify the brutalizing influence on public taste which newspaper artists unfortunately have. While there was little that was vulgar or too broadly humorous, one could not but feel that, though the technique was interesting, the artist's idea when not purely puerile was too often frivolous and his treatment of his idea merely flippant. Ten per cent, say, of the higher grade of drawings exhibited by themselves would have furnished a very much more instructive and attractive exhibition.

R. VON WALDHEIM, a publisher of Vienna, Austria, has set a most commendable example in publishing a small pamphlet, devoted to the competitive designs for the Kaiser Franz Joseph Museum, at Vienna. Not only are twenty-nine of the competitive plans reproduced, with four of the principal elevations, but they are accompanied by a very intelligent critical description, by Camillo Sitte. Nothing is more instructive to young architects, or to architects of any age, than the study of competitive designs. Even if they do not always agree with the jurors in their decision, they learn, at least, what sort of plans and elevations suit those jurors best, and they may turn their observations to profit on another occasion. It is hardly necessary to say that a work of this kind, so far as the critical portion of it is concerned, ought to be free from any suspicion of partiality, and perfect sincerity in this respect is, probably, more to be relied upon in Germany than anywhere else; but there is no reason why criticism of similar honesty and intelligence could not be secured by publishers anywhere else; and, with this aid, it seems as if pamphlet tracts of this sort upon the principal competitions might sell satisfactorily among the public, as well as in the profession, and they would do much to interest and enlighten the public in matters of art.

WIRE-GLASS WINDOWS.[1]

THE subject for which I shall have the honor of asking your consideration will be Wire-glass — the fire-retardant, a building-material which tends to reduce to the minimum the hazard of conflagration and conduces to the elimination of some risks attending the lives of us humble fire-fighters. The range of possibilities in fire-protection is too wide to speak of here, if I am to be favored with your attention, and only a small portion of it can be engaged in during this short session. I shall endeavor to advance that which I believe to be the most important factor in the protection of buildings against conflagration, and I shall be amply rewarded if I enkindle in your minds an inclination to seek more information upon the subject than I am enabled to communicate.

It is manifest to all thoughtful minds that the phenomenal development of the real-estate values in our cities has made the tall building a necessity and this necessity has brought with it the need of adopting in building-construction barriers to conflagration, and there are to-day buildings capable of enduring without structural injury the action of fierce, long-continued interior and exterior flames and the application of cold water upon their heated surfaces. Structurally a building of this class is admirable — the foundations are secure, the walls and roof fireproof, but openings in walls and roof are necessary to render it habitable. Obviously the vulnerable parts of a building are the openings in the walls and roof — its doors, windows and skylights. To these openings the spread of flame is almost wholly attributable. This has been the history of so many destructive conflagrations that experts have long agreed that no structure in a closely built city can be considered even approximately secure against fire so long as it is provided with only ordinary windows, skylights and doors. My experience and observation have been such as justify this opinion and I have most strenuously maintained that the quantity of wood contained in what I have termed "a structurally fireproof building," taking into consideration, also, the furniture and fittings, would, in the event of fire, endanger the property and the lives contained within it.

Shutters of iron, or of metal-covered wood, may protect windows if they are carefully closed, but in practice such shutters fall short of the purpose for which they were intended. When the crisis comes the shutter is frequently found open. Under the most favorable conditions an iron shutter at a fire is not the thing that the firemen want to come in contact with. Its rusty fastenings and blistering sides are objectionable, to say the least, and its reach, when it swings open, is liable to knock a man off the ladder. This is a risk to which the fire-fighter should not be subjected. There is no braver, manlier, or more faithful set of men in the pnblic service or out of it than the brave lads enrolled in our Fire Departments. I know of whom I speak and I am well acquainted with the chances they take. They are ready to fight with death every day. Every year sees them saving life heroically or dying in their duty. Their work is as trying, difficult and dangerous as there is in the world. Yet they are not safeguarded. I know what ready fellows they are and I feel that all known means of protection should be adopted to render their calling less hazardous.

Wire-glass is, in my opinion, the fire-stop for window and skylight openings — wire-glass set in metal frames. It supplies the requisite light and ventilation as well as protection against fire; its installation obviates the necessity of the cumbersome and unsightly hinged shutters and the projecting lugs and adjustors which support and secure them. It affords protection regardless of the janitor's neglect, because the thought of fire is not necessarily present in the mind of the tenant to induce him to close the window-sash and when closed it prevents the ingress, egress or communication of flame. It enables the fire-chief to size the situation and direct his men intelligently. The location and volume of the blaze are immediately disclosed and if the conditions warrant it the firemen can effect an opening for the stream with his fire-axe.

Hard conditions, great risks and the sacrifice of large property and many lives are preliminary to the establishment of standards, and by such means wire-glass has come to be recognized as standard and the degree of honor which is its legitimate due should be generally recognized.

Succinctly stated, wire-glass has yielded two fixed values as its contribution to fireproof building construction:

It retards fire without hiding it — permits the blaze to declare itself.

It can be cracked, but it cannot be scattered. If fractured it retains its place.

Now, we have to remember what we can't forget, and we are mindful, therefore, of experiences which enable us to fully appreciate the value first stated. Of the many embarrassments to which the fire-fighter is subject, that which prevents fire from disclosing its location in its incipient stage is the most serious. Within the congested districts of our great cities, our organizations are such as enable us to reach the scene of action and have our nozzles in hand within two or three minutes of the alarm, and if we could immediately get at the fire, we would, in most cases, have little difficulty in confining the blaze within the limits of the apartment in which it originated.

Modern science has equipped our departments with devices necessary to combat fire, the most contagious, virulent and disastrous of all perils to which buildings are subjected; and modern science has devised the means by which fire can be confined within the walls of buildings without rendering the same inaccessible to us, but the adoption of the means available is not general, and upon arriving at a fire we are frequently confronted with tin-covered and iron-clad shutters which obstruct our vision and our efforts to locate and conquer a blaze which becomes a conflagration because of the precious moments lost in concentrating our energies upon the seat of trouble.

This condition has long been a serious menace in all cities and it is now intolerable, because the installation of wire-glass presents no technical difficulties. It is of acknowledged efficiency and no less economical than effective. It has withstood the severest tests and its cost is well within the means of all building-owners. The insurance-companies give "preferred" rates when it is installed and thus practically invest in it. Their scheme is to reduce hazards, and in the belief that wire-glass effectually accomplishes this, they induce its adoption by substantial endorsement. Its ability to abate horrors and loss which attend conflagrations in cities is ample justification of the reasonable laws providing for its adoption, and an exigent public duty is presented to Building Inspectors to prevent these laws being nullified by official inertia.

There is a region paved with good intentions, and many easy-going owners of buildings contribute to this paving-fund by deferring the adoption of known means of protection and at the same time create occasion for regret from heavy financial loss and probable loss of life. I want to see the obligation placed upon owners of buildings to prevent such losses by the means which will effectually render fire non-communicative, and I think I have specified the means. The significance and overwhelming argument in favor of wire-glass as a fire-stop is the fact that when fractured it retains its place and continues to retard draught and its attending flames.

Doubtless, many of the Chiefs present have had occasion to recognize the efficiency of wire-glass as a fire-stop, and, of the many, Chief Musham's experience is especially worthy of reference. The fire which destroyed the Armour Lard Refinery, Union Stock Yards, Chicago, on the night of May 16, threatened for a time the entire district. Chief Musham was present, and he has stated that the wire-glass in the windows of the several walls prevented any communication through them and demonstrated the ability of wire-glass to prevent the spread of flame. The building destroyed was of recent construction, 100′ x 400′, five stories in height and subdivided into four sections by fire-walls, two of which were completely destroyed.

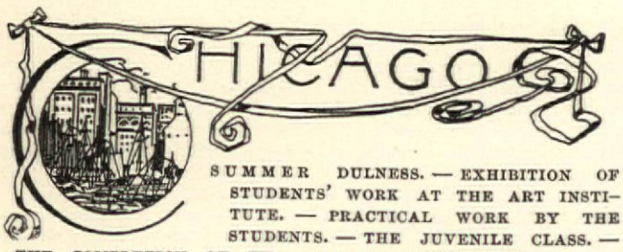
The quantity and nature of the material in combustion — refined lard — resulted in the hottest kind of a fire and its intensity and duration are hardly comprehensible. The Chief tells me that the flames reached to a height of 150 feet above the roof and the combustion was so perfect that scarcly any sparks were observed.

I am quoting Chief Musham because I think, perhaps, his observation of wire-glass in this instance was under a better condition than can be conceived for an actual service-test of wire-glass. The entire interior of the building was of inflammable construction, made more so by being saturated with lard, and its five great floors were loaded with tons of this highly combustible product. Tanks containing thousands of gallons of rendering were exploded and their contents dashed against the walls and windows, and the intensity of the heat was so great that the walls holding the frames and sash which accommodated the glass crumbled, but until they fell the wire-glass retained its place.

This fire establishes conclusive proof of the efficiency of wire-glass as a fire-retardant and its staying qualities, and for the purpose of illustrating my subject I have considered it preferable to my own experience.

[But wire-glass is not subjected to a fire-test every day, and except when fire is present it has undesirable, even dangerous, qualities. When the Engineering Experiment Station has time to study wire-glass, it will find in the many acres of this material at the South Terminal Station in Boston ample food for study and reflection. In the windows that face east, south and west and in the thousands of feet of pent-roof over the street-sidewalks there is hardly a sheet of the glass that is not cracked and shivered into a dozen or a hundred different pieces of glass, just now held in place by the embedded wire and the unequal planes of fracture of the glass itself. But where cracks are, there moisture and acid-gases can penetrate, and when corrosion has done its work on the wire there is likely to be many a repetition, less innocent, too, of the incident which attended President Roosevelt's reception in this city a few weeks ago when, as the newspapers reported, a sizable piece of this shattered wire-glass fell onto the platform not far from the President. Meanwhile, before the time comes when falls of heavy pieces may be looked for, much of this shattering of the glass is already accompanied by the flying of fine splinters of glass, and as the oculists of Boston are said to have recognized a class of injury that they call "elevated-railway eye," it is not impossible that they have been called on to treat for wire-glass eyes travellers who have to use the Boston Terminal Station. As fracture occurs least often on the north side and most frequently where the windows face the rising sun, it is evident that the manufacturers must give further study to the qualities of radiant heat before wire-glass can be held to be a perfectly safe material to use. — Eds.]

[1] A paper, by Edward F. Croker, Chief of Fire Department, City of New York, read at the Thirtieth Annual Convention of the International Association of Fire Engineers, held in Grand Central Palace, New York, September 16, 17, 18, 19, 1902.



SUMMER DULNESS. — EXHIBITION OF STUDENTS' WORK AT THE ART INSTITUTE. — PRACTICAL WORK BY THE STUDENTS. — THE JUVENILE CLASS. — THE COMPLETION OF THE ART INSTITUTE BUILDING. — A PATRIOTIC ELECTRIC FOUNTAIN. — THE BLACKSTONE BRANCH LIBRARY. — THE IROQUOIS THEATRE.

IN building-circles here in our city a summer calm seems to prevail. With the exception of a few large office-buildings which are now in the process of erection, but little actual construction seems to be going on, and also, with a few exceptions, the architects' offices are rather quiet, with but little that is interesting on the boards. Chicago, which is supposed to resemble the watcher of Israel in one respect, that she "slumbers not nor sleeps," really does seem to take on a more reposeful air during the summer months, and schemes are not matured during July and August.

The Art Institute falls into the same attitude and, in spite of a busy summer-school in its school-rooms, the lecture-hall remains undusted, the exhibitions cease to rotate, and the library no longer is full of the busy crowd of students "hustling for cult," as the typical Western girl is supposed to have phrased it. Notwithstanding that there have been no exhibitions for the last two months which have been considered worth heralding, still that of the students' work, which has filled all the galleries, large and small, in the south wing, has been one of unusual interest and also one which should make the true Chicagoan swell with pride. The work, from the children's Saturday-morning class up to that of the young men and women in the life-class, is fine. All the departments give really good exhibitions of the work done in them, and the general spirit of earnestness and enthusiasm which is evinced in all branches speaks volumes for the success of the school. And neither is the success all to be obtained in the future, for it is common report already that students from the Chicago Art Institute are welcomed in the Paris studios with greater cordiality than from any other American art-school, as being men and women better fitted for good work. The Art Institute is following in its teaching one method, which seems especially to give good results. This is the idea of letting the advanced students in all departments do actual practical work, not alone the everlasting drawing of studies. Thus, the embryo sculptors, though most who do so have passed the embryonic state, combine and produce some really impressive works of art. The work this year is exceptionally fine. One piece is a fountain representing our five Great Lakes, and both in conception and execution is good, much better by far than many a fountain seen in parks and at street-corners. Another one of these large compositions, conceived and executed by the students, is in the nature of a monument. It consists of a funeral cortége of ten life-sized figures, six bear a sarcophagus, two draped and bowed figures, their faces buried in their hands, walk in advance, while two hired mourners bring up the rear. The whole composition is fine, with not only artistic merit, but a certain poetic touch and feeling about it which is unusual.

No such applied work is seen in the architectural department and it seems a pity that the students should not be given a chance to combine with the sculptors. It is an often recognized fact, and one much to be regretted, that many a good piece of work for a fountain, statue, or monument, is marred or ruined in its general effect by its poor setting. Why should not the young architect furnish the designs for the bases or pedestals for the excellent work which the students in modelling do. If the architectural students could be properly trained in this direction a long felt want might be supplied and a lack in a certain part of the average architectural education made good. Mr. St. Gaudens knows enough to demand that some really well-educated architect should design a proper setting for his work.

Similar in nature, in the matter of the practical application of their art, is the composition of a frieze for school-house decoration by the life-students in oils. Whether any special place is going to be fortunate enough to obtain the work the catalogue does not state, but it certainly is a charming composition of children at play-time, done in rather flat opaque colors, and would be a delightful feature in any school-corridor, large assembly-hall or kindergarten room.

The work in applied design is delightful, in competitions for book-covers, lacework, book-marks, etc., but is weaker when it borders on architectural design. Some good things are shown in this line in tilework, glass, etc., but the architectural work generally makes the weakest showing. There does not seem to be the same enthusiasm evinced among the students of this department as elsewhere. The strictly architectural compositions have good points, but they have to be judged by a high grade, if we are to accept for a standard that set by the other departments, and, while not poor, we should be glad to see better work in this section next year. However, taken as a whole, the school shows a high standard of work which is very surprising and an enthusiasm which is quite inspiring. The number of students is 2,333, over three hundred of them being in the Saturday-morning juvenile class.

In connection with this juvenile class an experiment is being tried which may eventually do much to spread a knowledge of matters artistic. This is known as an Art Institute Extension, and is being tried in Winnetka, a suburb of Chicago's always in advance in municipal and educational reforms. The use of the corridors of one of the modern school-houses is given to the Art Institute, which sends out teachers, equipment, etc., the classes being just the same as those in the Chicago school, the children's studies going in to be marked and passed upon, and they themselves being taken in for lectures and visits to the galleries from time to time, while avoiding the weekly trip which to many of them would be impossible. Taken all together the Institute is the greatest achievement in an artistic way Chicago has ever accomplished, and very soon the building will fully equal in perfection the treasures which it holds.

Many people do not realize that the façade facing Michigan Avenue is but a small part of the actual building. It was planned to extend back to the Illinois Central tracks and was so arranged as to be possible to build different parts in different years. These portions have been added from time to time, as for instance, the increase in students' quarters, later the Fullerton Hall, then the Ryerson Library, till this year comes the fine gallery, extending through two stories, destined to house the splendid Trocadéro collection of casts, a gift to the Art Institute from the French Government after the World's Fair. With the erection of this gallery the entire plan of the building is nearly worked out, there only remaining the monumental stairway to complete the grand whole. It is to be hoped that before long it will be possible to materialize this last feature, as doubtless it will add much to the impressiveness of the building, though to the ordinary visitor the present entrance and stairway seem adequate.

During the past year there has been exhibited at the Institute the central figure of a fountain, which has this summer been unveiled on a West Side square known as Independence Square. An electric fountain in commemoration of Independence Day, it is somewhat of a shock to our preconceived ideas of what that or any other fountain, in fact, should be, with the traditions strong upon us of nude Goddesses of Liberty, swimming across the basin to crown with laurel wreaths equally nude Revolutionary generals, etc. This realistic treatment of a realistic subject is not without its charm however.

A real, genuine American "kid," the kind who gets up at three o'clock Fourth of July morning to make himself popular in the neighborhood, waves the Stars and Stripes above a sympathetic group, two girls and a boy holding aloft Roman candles. To further heighten the realistic effect and further shock artistic traditions, it has been arranged by some ingenious electrical device that red, white and blue lights shall appear at the ends of the Roman candles, and elsewhere over the group. Well, why shouldn't they? The Greeks painted the eyeballs of their goddesses. This is one of the first works passed upon and approved by the Municipal Art Committee, at this time consisting of Mr. Ralph Clarkson, artist, Mr. Leorado Taft, sculptor, Mr. Charles Hutchinson, President of the Art Institute, and Mr. W. L. B. Jenny, architect. The sculptor, C. J. Mulligan, is a Chicago man, and the casting was also done here. Good as the actual group is, it seems a great pity that the pedestal and setting should have been done by our State Architect and have borne his unmistakable hall-mark of commonplaceness. The figures stand on the well-known attenuated drum form, which seems in some minds to have a patriotic significance. It is dotted round with stars here and there and is entirely without strength or grace in design. It is altogether poor in design, and is a striking example of that combination before alluded to where the pedestal injures the effect of the work of the sculptor.

Several buildings of a public character are either in the first stages in the process of erection or are on the boards, ready at short notice to become realities. Noticeable among such work is the Thomas B. Blackstone Memorial Branch of the Chicago Public Library, 49th Street and Washington Avenue, and the Iroquois Theatre, to be erected on Randolph Street. The Library, which will hold about forty thousand volumes, will cost in the neighborhood of two hundred thousand dollars. It is to be of granite, Classic in style, and surmounted with a dome. In the interior this dome is to form the central point for a series of decorative paintings, from the brush of Mr. Oliver D. Grover, one of our Chicago artists. Mr. S. S. Beman is the architect of the building. Judging from the drawings, the building is dignified and good in proportion and outline.

Before the drawings of the Iroquois Theatre one pauses aghast. Perhaps it would be well to suspend judgment till the actual building can be seen. The façade suggests a titantic struggle for mastery between severe Classic and Rococo, both of the contending parties putting in as loud a claim as possible. This combat in glazed terra-cotta and iron, for these are the materials to be used, is described by an enthusiastic critic (?) as resembling in many points the Illinois Theatre, from the same architect's office, and, like it, being a "structure greatly admired for its classic repose." He further says, "In order to meet the spirit of the times half way, the architect has planned a façade in the modern French style, with some composite decoration to give it freedom and a quasi-original character. The base of polished granite is surmounted by columns and an elaborate front of glazed terra-cotta ornamented in the triangle of the roof with a huge escutcheon upon which is carved in heroic size the bust of an Iroquois Indian." It sounds a bit like a joke — Classic repose, modern French, and an American Indian on an escutcheon in the roof's triangle, alias pediment. That the theatre will be well equipped from a professional standpoint is, doubtless, true; that it

will afford ample comfort to its patrons is also equally true; but that it will be a work of art Chicago may well be proud of is as equally untrue, if one may judge from what is given to the public at present. The papers alluded to are already beginning to applaud it, and the public will, doubtless, follow suit, as they did in the case of the Illinois Theatre, by the same architect. It is discouraging to see, when it comes to critical architectural taste, how little discrimination the even fairly-educated man or woman has. The designs for the Iroquois Theatre are simply uncouth and of poor proportions, and yet we are told with enthusiasm that the architect "has been given *carte blanche* to provide the finest building for theatrical purposes that skill and money can secure."

One most interesting spot is where the problem of the mammoth foundations for the First National Bank Building is being worked out. Piles, concrete and steel no longer solve the question, but wells are being dug down to bed-rock, and these filled with concrete make the rock of ages on which will stand the First National. The work of excavating the wells is being done by miners, which would seem to be somewhat of a merciful dispensation in this time of coal-strikes. Work goes on through the entire twenty-four hours, three gangs of men interchanging with each other.

Just at present the inefficiency of the city Building-department is being shown up by a committee appointed by the Council for investigation. Building Commissioner Kiolbassa and his fifteen subordinates are being placed on the rack. Among other discoveries the committee found that there were eleven hospitals in Chicago for which permits had never been granted as hospitals. Apparently, no records worthy the name had been kept in the department, and on investigating the charge that the subordinates were too overworked to give proper attention to such things, it was found that on one day one of these overworked men visited two buildings close together and that on other days he did not visit any.

Just at present our aldermen seem to be in a very pugnacious state. The station-platforms of the elevated roads are much decorated with bill-boards. The corporation counsel has discovered that the city ordinances are being violated and a raid has been made on the posters by Alderman Frank Race, assisted by a gang of workmen. It is comforting to find that occasionally some one is stopped in his mad career of violating some municipal law in our poorly governed city.

PRUSSIAN BILL-POSTING REGULATIONS.

THE following account of a recent Prussian act concerning bill-posting in the country districts has been communicated to the London *Times* by Mr. Richardson Evans, Hon. Secretary, Society for Checking the Abuses of Public Advertising: —

"I desire, by your permission, to offer some account of a stimulating example lately set in Germany. An act to prevent the defacement of scenery was passed in the last session of the Prussian Landtag. It runs as follows: —

"'With the object of preventing the disfigurement of places remarkable for their natural beauty, the police authorities are empowered to prohibit outside of towns (*ausserhalb der geschlossenen Ortschaften*) such advertising boards or notices or pictorial devices as disfigure the landscape, by means of police-regulations issued in accordance with the law of July 30, 1883. Such regulations may apply to particular areas or spots.'

"Instructions, we are glad to learn, have now been issued by the central Government to the local authorities for the strict enforcement of the provisions of this salutary measure, and it may be expected that many painfully familiar eyesores on the frequented routes will speedily disappear.

"There is beauty worth saving in the street as well as on the river or among the mountains. But it appears from the proceedings in the Landtag that regulations already exist which are considered adequate for the protection of urban areas. As regards the open country, the Prussian Legislature has gone upon the lines which we are anxious to see adopted in English practice.

"1. The law is elastic; it places an effective remedy within reach where a grievance exists, but avoids any interference with general usage in the matter of business-notices.

"2. It sets up no arbitrary distinction between one class of conspicuous signs and another. The sole criterion is disfiguring effect. There is one and the same rule for the big letters on the wall of a building which announces that it is Messrs. So and So's manufactory and for the multitudinous puffs which the same firm sets up along all the highways of travel.

"3. The ground of public policy upon which we rely was asserted throughout the debate in strenuous terms. In the report of the committee which submitted the project occurs this paragraph: —

"'What is needed is the creation of a legal basis. We must do for the country what is already recognized as right for the town. The equitable interest of all who love beautiful nature is in question — that is to say, of most persons, whatever their nationality may be, who travel for pleasure. Nor can we overlook the pecuniary loss that will accrue if the progress of disfigurement diminishes the profits from the tourist traffic.'

"In the final debate in the Upper House, Herr Spiritus, the reporter of the committee, developed more fully the doctrine of the higher utility: —

"'We of the Rhine districts see many hundred of thousands coming every summer from far and near to seek on the sunny heights, wooded hills, and shady valleys rest and delight. All return strengthened and entranced. . . . It is the same elsewhere. I trust that the conviction will grow that it is the sacred duty of our generation, especially of our public men, to preserve for posterity these beautiful tracts of the Fatherland.'

"Let me add that the assent of the Diet was by no means perfunctory. All the stock objections, the claim for compensation, for exemption in favor of this or that order of advertising-sign, were urged and decisively rejected. The Hessian Legislature has included provisions of a similar character in a statute enacted recently for the protection of public monuments.

"Such is the way in which the wise and eminently practical people of whose progress so much is said among us order their affairs."

THE LAST RESTING-PLACE OF THE ANGEVIN KINGS.[1]

EVERY student of history who has wandered through the solemn choir of Westminster and the wonderful chapel beyond it has remarked how incomplete is the series of royal tombs which they contain. Of the missing sovereigns the greater number sleep in places sufficiently familiar to most of us — Winchester, Faversham, Reading, Worcester, Gloucester, Canterbury, Leicester, Windsor, Frogmore — but a few, including some of those whose names have thrilled the historic imagination the most strongly, have found their last resting-place in foreign ground. To visit every tomb abroad which is associated with English royalty would, indeed, be an extensive journey. It would take the reader, for instance, to Hanover, as well as to St. Germain, to Rouen, to Caen, and to the basin of the Loire. The present paper, however, is concerned only with the district last mentioned.

Save that it is in France, the position of Fontevrault upon the map is not perhaps very definitely known to most people. It will be found, then, on the southern border of Anjou, in the Department of Maine-et-Loire, and about nine miles south-east of the town of Saumur; and the present writer and a friend, finding themselves recently in that part of the Loire country, determined to make a pilgrimage to a spot which had always loomed in their minds, though in a somewhat shadowy manner, as a shrine of English history. The start was made from Saumur on a fine morning in September, and for the first few miles the route lay eastwards along the left bank of the Loire; but at Montsoreau, not far short of the point where the Loire receives the Vienne, a road branched off toward the south, ascending gently through orchards along the west side of a small valley. A very short ride from Montsoreau brought the object of the journey in sight. Straight ahead stood the little gray town of Fontevrault, and to the left, a few yards down the slope, rose the long slate roof of the Abbey church, with two turrets capped by spires at the west end, and over the crossing a tower having two pointed windows in each face and a slate-covered superstructure crowned by a pyramidal slate roof. In a land where central towers are not common such a sky-line had about it a strange and appropriate reminiscence of England. To the left of the Abbey the ground sloped more sharply down to the bottom of the dip, of which the farther side was clad with woods.

Fontevrault is dismissed by "*Baedeker*" in a dozen lines, yet it must have been a place of great interest, apart even from its principal building; for the Abbey was once surrounded by a number of dependent priories and other institutions which formed with it a considerable town. Of these buildings there are said to be still some remains;[2] but on the present occasion time forbade to do more than wander through an old church which had a wooden colonnade against it and contained two mediæval oil-paintings, and admire for a few moments the grace with which a party of soldiers at drill outside were wielding long ashen switches that did duty for swords.

How to get into the Abbey itself it took some time to discover, for in the high wall that surrounded it no open door gave a glimpse of the life within. But at last a peal of the bell at a great gate facing the main street had the desired effect. A key grated in the lock and the door swung ponderously open, disclosing, not the picturesque apparition of monk or nun, but the neat uniform of a prison warder! For the once splendid Abbey of Frontevrault, like many other religious houses, was suppressed at the Great Revolution, and in 1804 was actually degraded to a house of correction! Admission, consequently, is granted to the church and its immediate precincts only, and involves certain rather irritating formalities. The visitor is taken first into a porter's lodge, where he incribes his name, occupation, abode, and other particulars in a book, which is then sent over for the inspection of the *Directeur*. His admission being authorized by that officer, he is next conducted across the quadrangle and handed over to a second warder, who takes him into a rather narrower court and there introduces him to a third. So far there has been little to arouse his archæological interest. The white buildings around, from whose windows the inmates, clad in white canvas, peer curiously at him, are plainly modern, and the uniform of the Republic upon the warders, and upon the sentries in the second court, proclaims even

[1] Extracts from a paper in the *Nineteenth Century* for August, 1902, by Cecil Hallett.

[2] The surroundings of the Abbey include a curious mortuary chapel of St. Catherine, dating from the first half of the thirteenth century, and described by De Caumont as square, with a pyramidal roof crowned by a tall octagonal hollow shaft ending in an open lantern.

more frankly the abolition of the old order. In crossing the second court, however, he does catch a glimpse of a very singular building on the right, a sort of low tower with a steep conical stone-roof crowned by an open lantern. This remarkable structure, which is misnamed the "Tour d'Evraud" and recalls similar erections at Stanton Harcourt and Glastonbury in our own country, dates from the twelfth century and was undoubtedly the Abbey kitchen.

Meanwhile a third warder has unlocked a door at the farther side of the court, thereby revealing a winding flight of steps, on descending which the visitor finds himself in a great cloistered quadrangle, its court gravelled and planted with rows of small trees, with benches between. The cloisters, which have rooms over them, are externally Renaissance, but have Gothic vaulting, which, however, shows abundant signs of decadence. Round this court the buildings were arranged after the manner usual in the Benedictine Order. To the south they placed the refectory and offices; to the west the residence of the abbess; to the north the nave of the church; to the east the dormitory — a refined example of the early Renaissance — and below it the calefactory, the scriptorium, and the chapter-house.

The last-mentioned room — the only part of the domestic buildings to which visitors seem to be admitted — is entered through an elaborate Renaissance-Gothic doorway in the east cloister. Built perhaps in the twelfth century and remodelled in the sixteenth, it is a large oblong room with Renaissance windows and a soaring Gothic vault supported on two Renaissance pillars in the middle; and its walls are adorned with Renaissance frescos of the Passion.

From the north cloister a small door admits to the church. Here the visitor is at once met by a keen disappointment. The nave, whose exterior promises so much, has actually been walled off and converted to secular purposes; indeed it is described in 1851 as divided into three floors, with a mess-room in the lowest, cells in the second, and a dormitory in the third, with attics above! How interesting a specimen of early twelfth-century architecture is thus lost to the public (to say nothing of the dishonor done to the consecrated building) may be gathered from Verneilh's "*L'Architecture Byzantine en France*" (Paris, 1851). The choir and transepts have been retained as a chapel for the prisoners, whose rude wooden benches occupy most of the floor even in the eastern arm, and are so set that they all face the altar, which now stands under the central tower. The eastern half of the church is later than the nave, though both date from the twelfth century. The great apse in which the choir terminates is more lightly conceived than is usual in Romanesque architecture. Its numerous arches, narrow and "stilted," are supported on cylindrical pillars of a height and slenderness almost too marked, perhaps, for just proportion. But to English visitors the general architecture of the place, however worthy of attention, will be but a background or a setting to a certain small chapel opening out from the east side of the south transept, where the light falls through the windows of an apse upon four stately figures that sleep side by side behind an iron grille, with their feet towards the west. They are royally robed and crowned, and bear traces of a once gorgeous coloring, and at their feet, in modern characters and in the following order from north to south, are written their names: Eleanor of Guienne (to us better known as Eleanor of Aquitaine), Queen of England, wife of Henry II; Henry II, King of England; Richard, called Cœur de Lion, King of England; Isabella of Angoulême, Queen of England, wife of John "Sans Terre." . . .

The Angevin Kings, it will be remembered, were essentially continental potentates. Their dominions in western France extended from the Channel to the Pyrenees, and to them — even to Henry II — England was little more than a source of revenue — of revenue that could be spent upon their ambitions abroad. That they should have been buried in French soil, and especially in Anjou, of which province they were the hereditary Counts, is therefore not surprising. . . .

In 1793 the Abbey, like so many others at the same period, was suppressed. The process was gradual and the successive incidents need not be related here. Its climax was reached, perhaps, when the Revolutionaries, excited to frenzy by the peculiarly aristocratic character of this monastery, burst into the precincts with cudgels and axes and carried havoc into every corner — havoc which was announced to those without by cries of "The royal Abbey is fallen at last!" The church, of course, was the scene of wild violence, of which one of the principal objects was the great royal tomb. The kneeling statues of Raymond and Joan were broken up, and how the remaining four figures escaped it is indeed impossible to explain, unless they were saved by their more secluded position in the depth of the alcove. It is doubtful what became of the relics of the bodies — if indeed there were any. Some say they were scattered; some that they were scattered but afterwards collected and replaced. One story goes that afterwards, during certain operations in the church, a Mayor of Fontevrault found the remains of Richard and the heart of John; and further rumors have it that the latter was given to Monsignor (afterwards Cardinal?) Wiseman, who was then staying in the neighborhood, and that the former were sent to London. The antiquary M. Develle, however, on questioning a mason who had assisted in opening Richard's tomb in 1793, was told that not so much as a bone had been discovered. . . .

The late Charles Alfred Stothard, being then engaged upon his "*Monumental Effigies of Great Britain*," had come to Fontevrault for the express purpose of finding the Plantagenet tombs and including them if possible in the scope of his work. It was believed at the time that they had been destroyed, and great must have been his delight at finding them. He did not, however, find them intact, as various chips and fragments were lying about the cellar, having been knocked off doubtless by the prisoners. One result of his visit may be seen in the wonderful drawings contained in the "*Monumental Effigies*." Another was the suggestion which he made that the English Government should procure the removal of the effigies to Westminster Abbey. . . .

Stothard's proposal did, however, serve to draw attention to the fact that the effigies were in a disgraceful condition, and in 1819, it is said, they were moved into the Abbey church and placed, apparently, in the same part of it which they occupy at present. The English Government is reported to have renewed its request about this time, but with no better result than before. The position of the effigies, indeed, was still far from satisfactory. It is true that they were once more in the church, but they were thrust into an obscure corner of it and are said to have been treated with anything but respect by the tourists, who used them as benches; Montalembert expressly stating that they were in a bad condition when he visited them in 1831. Whether it was for reasons of this kind, or whether the explanation lies in the hold which Stothard's proposal had gained over the English mind, the removal of the Angevin sovereigns to Westminster was mooted again some time after the Revolution of 1830. But Louis-Philippe was no more able to comply than the Bourbons had been. . . .

It is said that in 1866 an English tourist, on returning from a visit to the Loire country, wrote to the *Pall Mall Gazette* and naïvely suggested, as if it were something new and original, that a presentation of the royal effigies to England by the Emperor Napoleon III would be a gracious act. His words, which are said to have found their way into *L'Univers Illustré*, were very possibly noticed in influential quarters. At any rate, their appearance was not mistimed, for it would seem that our Foreign Office had not allowed its oft-repeated demand to be forgotton, while at this moment Paris was full of her Exhibition at the Champ de Mars, the success of which would at least not be hindered by anything tending to strengthen friendly relations with England. Whether in consequence of these considerations or, as it is more pleasant to think, from a *sentiment de haute courtoisie*, the Emperor did actually offer the royal effigies to Queen Victoria. But the opposition to their removal showed itself more strongly than ever before. When the order came down from the French Secretary of State, the official whose duty it was to deliver them up refused to do so.

The Emperor had indeed exceeded his legitimate powers. The principle expressed in Article 525 of the *Code Napoléon*, that statues are fixtures if they occupy niches specially constructed to hold them, had been subsequently extended to statues on pedestals or otherwise, provided that there was evidence of an original intention that such statues should remain in position forever. Such evidence, of course, could not be wanting in the case of tombs; but even apart from this the *status* of fixtures which they had admittedly enjoyed before the Great Revolution had not been abrogated by any legal act, so that clearly they could not be alienated without the consent of the Legislature; while even if they had not been technically fixtures, no legislative act could have alienated works of art that had always been, in a sense, appanages of the French Crown, and that were also protected under the principles of *Droit Civil*. The opposition offered to their removal by the Society of Agriculture, Science, and Art of the Department of Maine-et-Loire, who petitioned the Ministry, was supported by the gentry throughout Anjou and by a feeling general in France, and the Emperor was compelled to write to the Queen and ask to be released from his promise. Needless to say, his request was granted, Her Majesty "not wishing that affront should be offered in her name to the pious and patriotic wishes of the kings, her illustrious predecessors of the house of Anjou." . . .

The royal effigies are better cared for to-day than at any time since the suppression of the Abbey. They may not even be photographed without previous application to the *Directeur* of the prison (a restriction prompted, however, less by love of Kings than by fear of cameras). They are protected in the more material sense from prisoners and tourists alike by an iron grille of uncompromising severity. Yet it is difficult to rest content even with their present condition, unless one belongs to that school of æsthetics which refuses to scrape whitewash off a fresco on the ground that, though the whitewash obliterates the fresco, to scrape it off would be to obliterate a phase in the history of bad taste. Their carved biers now rest upon the pavement; but imagination flies back to the time when they were elevated upon altar-tombs. . . .

Queen Victoria, in releasing Napoleon III from his promise, added her request that the church of the royal Abbey might be restored to Catholic worship and the effigies of the English sovereigns replaced in that position in the building which they occupied for more than five centuries. It is strange that a wish, coming from such a source and addressed to such a destination, should not have been gratified at the time.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES CUSTOM-HOUSE AND POST-OFFICE, NEWPORT NEWS, VA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

UNITED STATES POST-OFFICE, ANNISTON, ALA. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

A COMPETITIVE DESIGN FOR THE CARNEGIE LIBRARY, BURLINGTON, VT. MESSRS. WALES & HOLT, ARCHITECTS, BOSTON, MASS.

ELEVATION AND PLAN: LAND TITLE BUILDING, PHILADELPHIA, PA. MESSRS. D. H. BURNHAM & CO., ARCHITECTS, CHICAGO, ILL.

PROPOSED HOTEL, BOWDOIN ST., BOSTON, MASS. MR. BENJAMIN FOX, ARCHITECT, BOSTON, MASS.

[The following named illustration may be found by reference to our advertising pages.]

PAN-AMERICAN EXPOSITION, BUFFALO, N. Y.: MAIN ENTRANCE: ELECTRICITY BUILDING; — MAIN ENTRANCE: MACHINERY AND TRANSPORTATION BUILDING. MESSRS. GREEN & WICKS, ARCHITECTS.

[Additional illustrations in the International Edition.]

THE LIBRARY: HOUSE OF CHARLES M. GILMAN, ESQ., SOUTHPORT, CONN. MR. WM. H. BEERS, ARCHITECT, NEW YORK, N. Y.

FIREPLACE IN THE SAME ROOM.

MONUMENT ERECTED BY THE SALESIAN FATHERS OVERLOOKING THE BAY OF RIO DI JANEIRO, BRAZIL.

"AMONG the festivities in honor of the nineteenth centenary of the nativity of Jesus Christ, it is necessary to mention especially the festivity of the 8th of December in 1900, in which the Salesian Fathers of Nictheroy, Brazil, had a large monument erected on the top of a high hill, joining the Colegio Santa Rosa. The exceptional importance of this festivity was not only of a religious character, but also a patriotic one, as it commemorated also the fourth centenary of the discovery of Brazil.

"About 100 metres above the level of the sea, on the hill on which is located the Colegio Santa Rosa is erected a high column, terminated by a beautiful statue of gilded bronze, representing a Maria Auxiliadora. The total height of the monument is 38 metres, 32 metres being the height of the column, and 6 metres the height of the statue. On the rock on which the monument is erected is engraved the sentence: "*In petra exaltasti me.*"

"The base of the column occupies a space about 60 metres square, each side being about 8 metres long and 10 metres high, constituting the first part of the monument. An elegant chapel is inclosed and occupies the interior part looking towards the east, dominating the district of Santa Rosa and Icaraby, the most beautiful part of Rio Janeiro, and from the immense bay beyond the wharf can be seen a statue of the Virgin, shining like the sun, when the day-star sends its rays on the beautiful face of the Mother of God.

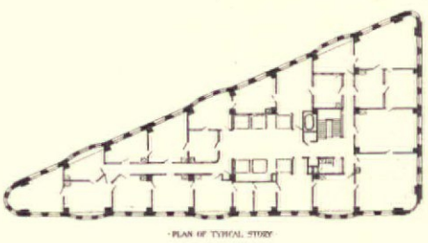
"On the posterior side is a comfortable stairway of cast-iron, which leads to the upper part of the monument. The rest of the base of the monument is occupied by several tombs, within which the Salesian Fathers of Brazil will put the venerable remains of our lamented Mons. Lasagna and some of the other victims of the terrible disaster of Juiz de Fora.

"On this base, an immense mass of about 600 cubic metres, is raised the elegant column, 17 metres in height, which, from the second part of the monument, has on each side a small window with a small corresponding balcony, and on the part overlooking the sea is a symbolic star which is illuminated with electric-lights with the words: "*Ave Maris Stella.*" This column, which has from the foot of the base 25 square metres of surface, diminishes towards the top, which measures 3 metres on each side. Here ends the beautiful winding stair, which curves in the monument, and whence visitors see an enchanting spectacle. At the same time the more audacious come up by another exterior stair of 6 metres, to the foot of the statue.

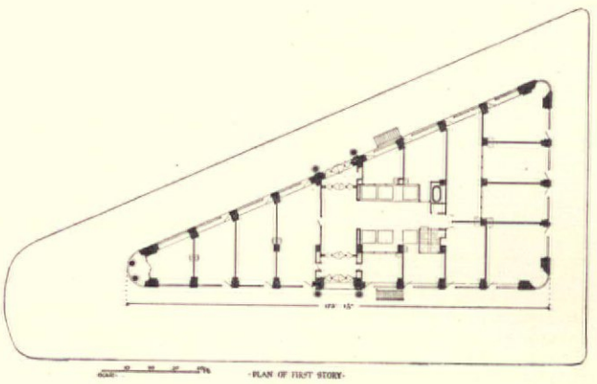
"The plan of the monument has been traced by an able engineer, Sr. D. Domingo Delpiano, a Salesian, whose celebrated reputation as architect is founded on his work in Brazil and Uruguay. The eclectic style combines in agreeable harmony the Byzantine, Moorish and Pointed Arch. There has been employed for the construction more than 300,000 bricks and about ten months of arduous labor. The statue, of copper, was cast in the foundry of Luis Del-Bo, of Milan. The neighborhood of Santa Rosa furnished the entire electric system. At the foot of the statue are three electric-lights supported by three large candelabra weighing about 600 kilos each. They illuminate the body of the statue. Besides these, there are 12 electric-lamps affixed in 12 stars, composing the diadem surrounding the head of the Virgin."—*Boletin Salesiano.*

LAND TITLE BUILDING, PHILADELPHIA, PA. MESSRS. D. H. BURNHAM & CO., ARCHITECTS.

"THE FLAT-IRON," FROM THE SOUTHEAST, 22D ST. AND BROADWAY, NEW YORK, N. Y. MESSRS. D. H. BURNHAM & CO., ARCHITECTS, CHICAGO, ILL.



PLAN OF TYPICAL STORY



PLAN OF FIRST STORY

"THE FLAT-IRON," 23D ST. AND BROADWAY, NEW YORK, N. Y. MESSRS. D. H. BURNHAM & CO., ARCHITECTS, CHICAGO, ILL.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

METAL-COVERED WOODEN FINISH.

BOSTON, MASS., September 23, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In re Fireproof Wood: In our report upon this subject what we had to do was to prove whether or not wood treated with chemicals had any right to the title of "fireproof." I recommended that wherever such wood should be used it should be encased in metal, giving preference to untreated wood because it is not liable to mould as much as so-called fireproof wood is.

In the same report we referred to the future test of substitutes for wood which can be moulded, framed and decorated in many ways and of which there are many kinds. That test waits the construction of a building or laboratory of sufficient size to put up the interior finish — doors, window-frames, dadoes and the like — in the same way in which they would be put up in any building.

It is singular to observe how strong the effect of habit is: some of the makers of doors and mouldings of metal and other substances seem to feel obliged to imitate a panelled wooden door of the ordinary type, as if a finer and much more artistic door might not be made of the materials which they use. In this imitation of wood in metal, they are governed partly by the instructions which owners give to architects rather than from the want of knowledge by architects of the decorative effects which may be given in metal without imitating wood.

Yours very truly, EDW. ATKINSON.

NOTES & CLIPPINGS

ACCIDENTAL ELECTRIC SHOCK. — The *Electrical World and Engineer* is the authority for the statement that accidental electric shocks seldom result in death unless the victim is left unaided too long, or efforts at resuscitation are stopped too early, as in the majority of instances the shock is sufficient only to suspend animation temporarily, owing to the momentary and imperfect contact of the conductors, and also on account of the resistance of the body submitted to the action of the current. The rules given to be observed and promptly executed with care and deliberation are as follows: —

"*Rule* 1. — Remove the body at once from the circuit by breaking contact with the conductors. This may be accomplished by using a dry stick of wood, which is a non-conductor, to roll the body over to one side, or to brush aside a wire, if that is conveying the current. When a stick is not at hand, any dry piece of clothing may be utilized to protect the hand in seizing the body of the victim, unless rubber gloves are convenient. If the body is in contact with the earth, the coat-tails of the victim, or any loose or detached piece of clothing, may be seized with impunity to draw it away from the conductor. When this has been accomplished, observe Rule 2. The object to be attained is to make the subject breathe, and if this can be accomplished and continued, he can be saved.

"*Rule* 2. — Turn the body upon the back, loosen the collar and clothing about the neck, roll up a coat and place it under the shoulders, so as to throw the head back, and then make efforts to establish respiration (in other words, make him breathe), just as would be done in case of drowning. To accomplish this, kneel at the subject's head, facing him, and seizing both arms draw them forcibly to their full lengh over the head, so as to bring them almost together above it, and hold them there for two or three seconds only. (This is to expand the chest and favor the entrance of air into the lungs.) Then carry the arms down to the sides and front of the chest, firmly compressing the chest walls, and expel the air from the lungs. Repeat this manœuvre at least sixteen times per minute. These efforts should be continued unremittingly for at least an hour, or until natural respiration is established.

"*Rule* 3. — At the same time that this is being done, some one should grasp the tongue of the subject with a handkerchief or piece of cloth to prevent it slipping, and draw it forcibly out when the arms are extended above the head, and allow it to recede when the chest is compressed. This manœuvre should likewise be repeated at least sixteen times per minute. This serves the double purpose of freeing the throat so as to permit air to enter the lungs, and also, by exciting a reflex irritation from forcible contact of the under part of the tongue against the lower teeth, frequently stimulates an involuntary effort at respiration. To secure the tongue if the teeth are clenched, force the jaws apart with a stick, a piece of wood, or the handle of a pocket-knife.

"*Rule* 4. — The dashing of cold water into the face will sometimes produce a gasp and start breathing, which should then be continued as directed above. If this is not successful the spine may be rubbed vigorously with a piece of ice. Alternate applications of heat or cold over the region of the heart will accomplish the same object in some instances. It is both useless and unwise to attempt to administer stimulants to the victim in the usual manner by pouring it down his throat."

"THE TRIUMPH OF NAPOLEON" IN THE LUXEMBOURG. — The Palace of the Luxembourg is one of the buildings which was associated with the triumphs of the first Napoleon. In 1797 the Directory gave him a reception in it when he returned to France with the treaty of Campo Formio. It was at the Luxembourg that he planned his *coup d'état* of the 18th Brumaire. In 1801 the building was used as the Palace of the Senate, and in 1806 fifty-four flags captured from the enemy were deposited there. Afterwards there was a fête and banquet, at which representatives of the Grande Armée were present. It was fitting that a commission should be given for an immense painting to be placed in the building, and which was to commemorate the "Triumph of Napoleon." The antique style was then in vogue, and Jean Baptiste Regnault, to whom the commission was accorded, showed the sovereign as a Roman emperor seated on a triumphal car, and surrounded by figures of "Victory," "Concord," "Peace" and "Wisdom." But in 1814 the power of Napoleon waned. The Controller of the Luxembourg was Semonville, and he lost no time in becoming a Royalist and in transforming the hall of the Senate in order that it might be worthy to receive Louis XVIII. All the symbols of Napoleonism were whitewashed or removed. From a large bust of the Emperor the head was taken off, and a label was placed on the part remaining to announce that it was a bust of Nero which was in the process of restoration. The immense picture of the "Triumph" could not be treated in the same way. Semonville was therefore compelled to give an order to a painter to substitute the face of the King for that of Napoleon. The Emperor, however, unexpectedly returned from Elba. Semonville fled, and the architect in charge of the palace had the visage of Napoleon restored. After the Hundred Days the King came back and Semonville was once more in power, but he had been taught to realize how insecure was sovereignty in France, and Regnault received £400 to paint out the figure of Napoleon and to substitute one of a woman typifying France. — *The Architect.*

PAPER BUILDINGS. — The *Paper-makers' Monthly Journal* reports that a Russian nobleman has upon his estate at Savinowka, in Podolia, a paper house of sixteen rooms, built in New York, at a cost of 80,000 roubles, and its architect declares that it will last longer than a stone building. Bergen, in Norway, has a church built of paper capable of seating a thousand people.

PHOTOGRAPHER VS. PAINTER. — "The New Photography" is the subject of two articles in the October *Century*, illustrated by examples of pictorial work with the camera. Alfred Stieglitz, founder of the Society of the Photo-Secessionists, gives account of the progress of the new movement here and abroad, and Alexander Black contributes a debate between a photographer and a painter, with a professor as umpire, on the burning question whether photography is an art. The following passage-at-arms presents one of the points of difference: "Look here," the painter exclaimed; "you don't suppose that I am insisting that only self-consciousness is intention. The thing I hold is this: that there is a vast, a final difference between the accidental personal expressions of a man and the accidental impersonal expressions of a machine. It seems to me, — with no disparagement of you, Mr. Photographer, — that if you stuck up a camera anywhere, and had it worked by clockwork long enough, you would occasionally, by some accidental combination of light, time, season, or incident, get as good a thing as a man could get by his added discernment. The beauty of these things being based on a natural reflection of nature, it is a question whether mere chance might not do more than personal interference." "My answer to that," retorted the photographer, "without expressing opinion as to the length of time you might have to wink the machine, is that if you were mechanically to spatter different colors of paint on a series of canvases, you would undoubtedly, in time, get an effect quite as expressive as some of the things you are willing to call art. It seems to me that whether or not both of these things are true, the fact remains that effects can be wrought, that things can be *said*, intentionally in photography. The fact that nature does some wonderful plastic feats hasn't hurt sculpture. In fact no art is or can be hurt by the circum stance that nature is more than a successful rival in the creation of forms. I don't see that the photographic accidents hurt the photographic intentions, and I think that when you have studied the expressions of recent photography you will not fail to find signs that photography, a science *per se*, is a medium of artistic expression, and that when it is so used, and in the degree in which it is so used, it is an art. In other words, I can't see for the life of me why the fact that photography has been a science shall forever stand in the way of its admission as an art."

MALLEABLE GLASS. — A description of tests upon the malleable glass now being manufactured in Matthews, Ind., is given as follows by the *Scientific American*: "A chimney was placed in a pail of ice-water, and after having remained a sufficient length of time to become as cold as the water, was taken out and immediately placed on a lamp with a blaze turned as high as possible. The blaze on the wick was turned so as to flow directly on the chimney, and the smoke which collected on the chimney ran down with the water without injuring the chimney. Next, a chimney was placed over a small gas-stove containing clay-bricks used in heating such stoves. The fire was turned on full, the chimney remaining on the bricks. The fire finally brought the temperature to such a stage that one side of the chimney was drawn in and dropped down, and no crack was shown in the glass; but for a slight roughness on the outside, the glass was as clear as when placed in the fire. Another test which was made was to place cold water in the chimney and hold the same over a fire until the water boiled. A large bulb was blown from the glass and filled with about one pint of water. It was then placed over the fire and allowed to remain there until it had boiled dry without apparent effect on the glass. Four chimneys were taken from the packing-room and dropped one by one into a pail of boiling water. The chimneys were then hastily shifted into a pail of cold water, that had just been drawn from a well, and the glass was not broken. A further test was made by nailing up a box containing glassware, every nail being driven in by hitting it with a chimney. The most remarkable feat of all was the making of a perfect lamp-chimney by using a chimney as a mould and blowing hot glass into the same. Both the new chimney and the mould came through the test perfectly whole, uncracked, and unscarred. In appearance this malleable glass is much like the common product; it is, if anything, a little clearer than the glass now in use, and in its molten state is much more elastic. It can be made of the thickness of a sheet of paper, or as heavy as any in use, but in every instance it is tough — a dainty table-glass could be handled as roughly as a skylight, and no harm result. The advantages conferred by this toughness in the wide variety of glass utensils for domestic use are very numerous."

RUSKIN'S ENGLISH. — A civil-service-academy journal recently gave a model exercise. The subject for essay was "Mountains and their Beauty," and a wily but suspicious reader copied out an essay in competition. He wrote it in the beautiful, stiff civil-service hand with all the letters joined in the middle; he punctuated it carefully, and made it, in every sense, a creditable production. He was awarded 41 per cent for English. He was told that his English was rather stiff, and that his descriptions were not lifelike, and were too "journalistic," whatever that may mean. Also, his sentences were too long and his ideas lacking in originality. It was a very sad reflection to think that it was an extract from Ruskin's "*Modern Painters*" on "Mountains and Mountain Beauty"! One candidate got 97 per cent, being twice as good as Ruskin apparently. — *Liverpool Post.*

OLDEST THRONE IN EUROPE. — According to the *Fronde* there is an older throne in Europe than the one on which the King was crowned, and that throne is in France. The throne belonged to King Dagobert, who reigned in the seventh century, and it is in the Cabinet des Médailles at the French National Library. Dagobert's throne, which is of brasswork, was forged and chiselled by Saint Eloi for King Dagobert, and 100 years ago was used for the last time in a public ceremonial — that of the distribution of the eagles by the first Napoleon.

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, OCTOBER 4, 1902 No. 1397

CONTENTS.

SUMMARY: —
The "*Georgian Period.*" — The Coal Strike. — The New England Coal Measures. — The Office of the Supervising Architect under Mr. Taylor. — The Office now a Place for ambitious Draughtsmen. — The Wholesale Grocery Employés' Union of Chicago voluntarily seeks Incorporation. — The Trade-unions Comedy in Australia. — A Protection against High-tension Electricity. 1
ITALIAN TOWN-HALLS OF THE MIDDLE AGES. 3
SOUND-PROOF PARTITIONS. 5
IS THE ARCHITECT A BLACKMAILER? 6
BOOKS AND PAPERS. 6
ILLUSTRATIONS: —
The Ducal Palace, Venice, Italy; — Palazzo Pubblico, Perugia, Italy. — Palazzo de' Consoli, Gubbio, Italy; — Palazzo Apostolico, Orvieto, Italy. — Palazzo del Podestà, Florence, Italy; — Palazzo Comunale, Todi, Italy. — Palazzo Comunale, Cremona, Italy; — Palazzo Comunale, Piacenza, Italy. — Palazzo della Signoria, Siena, Italy; — Palazzo Vecchio, Florence, Italy. — Palazzo del Comune, Pistoja, Italy; — Hall of the Fraternity of St. George, Genoa, Italy.
The Louisiana Purchase Exposition, St. Louis, Mo.: A Corner of the Textiles Building; — The Fine-Arts Building.
Additional: Communal Hall, Piacenza, Italy: Side View. — Hall of the Jurisconsults, Cremona, Italy. — Competitive Design for the City-hall, Newark, N. J. — Elevations and Sections of the Same. 7
COMMUNICATION: —
A Voice from the Coal Region. 7
NOTES AND CLIPPINGS. 7

"IT is, indeed, a valuable work, for the historian, scholar and reader of American literature as much as for the student of architecture."—When, in spite of the multitudes of complete new books which lay claim to its notice, the *Nation* finds it worth while to give serious consideration to each fragment of the "*Georgian Period*" as it appears and to express, in terms more or less similar to those which we quote above from its review of the Tenth Part, its appreciation of the manner in which we are accomplishing our undertaking, we feel more and more satisfied that those who have joined with us in the production of the work have just cause for gratulation that their names will be associated with the production of an acceptable fragment of architectural literature. For our own part, we hope that, in the fulness of time, our account-books may show that we had a commercial justification in expending the many thousands of dollars the work has cost us. But, though the general reader finds the work interesting, it was intended primarily for the architect, for those the bulk of whose work consists in the building of five or ten thousand dollar houses quite as much as for those to whom a hundred thousand dollar job is no rarity. It is emphatically a *useful* publication to architects and builders of every grade. This reference to the "*Georgian Period*" is in the nature of a "last call,' for the reason that on the publication of the Twelfth Part, which is now nearly ready for the press, the discount now prevailing will be discontinued. It would, therefore, seem to be only good business policy on the part of those whose sets are incomplete and those who intend eventually to procure the work to take advantage of the fleeting chance and send in their orders now.

THE great coal strike, or, rather, the great assault made upon the public in furtherance of a conspiracy between politicians and would-be union tyrants, is rapidly approaching the alarming stage. Although a small military force is in the anthracite region, it seems to be without efficiency or authority, for the strikers assault and kill men every day, and blow up houses with dynamite, apparently with impunity, the military appearing, in the newspapers, only as having been "stoned by the mob." The commanding officer seems to be disposed to act, but it is not easy to do much under instructions which oblige soldiers to submit in silence to "stoning," and which expose any one who uses his rifle or bayonet in self-defence to immediate arrest and incarceration on a charge of murder. Meanwhile, the supply of coal in the Eastern cities is being rapidly exhausted, and a few days of cold weather, which may be expected at any time now, would cause great suffering. Some large city schools have already been closed, on account of the impossibility of warming them; and the hospitals must follow, unless relief is soon given; while the poor people are already suffering. One poor laundress, within our knowledge, has already been obliged to send her customers word that she cannot take any more work, not having any means of heating water; and there will soon be many similar cases, followed, as winter approaches, by thousands of deaths from cold and privation.

IT is curious to see Mr. Mitchell, who could set the miners at work with one word, making the tour of the country, to ask the people whose distresses are due to him to contribute of their scanty means to support his plans for putting himself in control of the anthracite industry, especially after the exhibition which he is making of his devotion to the cause of the "toilers," by sending off, under his direction, as he claims, thousands of anthracite miners to the bituminous coal regions, to take the bread out of the mouths of the bituminous coal miners, who have been the most generous contributors to the anthracite strike fund. In the meantime, the clamor of the Republican newspapers for some grand stroke on the part of President Roosevelt, or his administration, in seizing the mines, "compelling arbitration," or some other unconstitutional abuse of power, is taken, whether rightly or wrongly, by a large part of the community as an indication of collusion between the strike leaders and, perhaps, the coal operators, and influential Republican politicians. Naturally, the Democratic election committees are preparing to take advantage of this feeling at the November election, and it is doubtful whether the country would not, in the end, be benefited by a severe rebuke at the polls to a party incapable of defending citizens in the peaceful exercise of their employment, and responsible for such an act of oppression as the Pennsylvania miners' license law.

SO far as New England and New York are concerned, it is strange that relief should not be sought from the anthracite mines which underlie a great extent of territory in Massachusetts and Rhode Island. For nearly a hundred years, anthracite, of a very hard quality, but quite available for purposes to which the Lehigh coal is adapted, has been mined in a small way near Tiverton, Rhode Island, and used in the neighborhood. So long as the Pennsylvania anthracite could be obtained at a reasonable price, it was preferred; but, that supply being cut off, it seems as if the Tiverton beds, which contain an enormous body of coal, might be utilized. In case of need, it would be quite within the powers of the States of Massachusetts and Rhode Island to seize the mines and operate them, just as Governor Hoffman, in New York, thirty years ago, seized the Hudson River Railroad, on the occasion of a strike of trainmen, and operated it under martial law; and such a precedent would be far less dangerous than the interference of the Federal Government in such affairs, or than Constitutional amendments in favor of "compulsory arbitration."

FEW things have been more satisfactory to watch than the developments that have attended the reorganization of the office of the Supervising Architect of the Treasury Department, begun by Mr. Aiken and carried by Mr. Taylor to a higher level than any one thought could be possible. When the Tarsney Act was to be accorded a trial, it was, in the ranks of the profession, rather taken for granted that the designs prepared in the offices of private practitioners, selected with care and discrimination, would by their superior merit greatly overshadow the designs prepared under the eye of the Government's official architect. But, without in any way detracting from the merit of the designs prepared under the Tarsney Act, we feel that architects generally will agree that the average architectural worth of the designs for which Mr. Taylor is officially responsible has at least equalled the average worth of those prepared by private architects, under the workings of the Tarsney Act. That as little as this can be safely said shows in itself how great a change has been accomplished and how grateful the profession, and the public at large, should be to the man who has had the good sense, the patience and enough self-abnegation to bring about the long-desired improvement. Mr. Taylor recognized that, no matter how much the routine methods might be changed and bettered, good results could not follow unless the work of all kinds could be handled by

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.

Entered at the Post-Office at Boston as second-class matter

designers and draughtsmen as competent, well-trained and reliable as those who held permanent places in the best private offices, and one of his first cares was to replace incompetent political material with trained architectural ability. In this he gradually succeeded, and the throwing the protection of the Civil Service law over the members of the working force has helped him to secure a grade of assistants that would hardly have been possible without it. The consequence is that the personnel of the office is of an unusually good type and the place has acquired the real atmosphere of an architectural studio, to have access to which a young man may now honorably be eager. Ten years ago it would never have occurred to us to recommend an able young man to secure a position in the Supervising Architect's office; it would have been simply to advise his voluntarily seeking to degrade his own talent and set a bar across the path of his professional progress. Happily, things are changed, and we can now not only advise but urge young men of ability, who have not the connection and backing that entitle them to believe they can become successful private practitioners, to seek a position in the Government office.

WE speak of the matter because, just now, the office is in need of a score or so of competent young men, and as the Civil Service Commission is to hold an examination for the establishment of an eligible list towards the end of October, we believe it is well worth the while of draughtsmen of real ability to take the time to pass these examinations and secure a place on the list, as a kind of "anchor to windward," even if they have no immediate desire to become public servants. The places to be filled yield salaries of from eight hundred and forty dollars to twelve hundred dollars per year, with chance for promotion and increase of pay up to twenty-two hundred dollars per annum. The hours are short, from nine to four o'clock daily, the year through, but with generally a chance for leave of absence for thirty days, on full pay, at some convenient time. The hours and the pay are attractive — they always were that, at least — but what now makes it worth while to pass the examination is the chance of securing the *entrée* to a thoroughly well organized office, where a vast amount of interesting work is done, and to the agreeable companionship of a group of highly-trained and capable associates. A very large number of public buildings was authorized at the last session of Congress and further bills will be introduced at the next session, so that there is little likelihood that the office force will be curtailed by compulsory discharges for several years to come, and as we have every reason to believe that Mr. Taylor has so firmly established the fact that he is the right man for the place that there is little likelihood that he will not be reappointed at the end of his official term, there seems to be good grounds for believing that the tone of the office will long remain as agreeable as it is now and the work produced there as instructively interesting.

THE Wholesale Grocery Employés' Union of Chicago has set the example of voluntary application for a charter of incorporation, under the laws of Illinois. This step is taken as a preliminary to the making of contracts between the union, as a body, and the employers, which the members of the union believe can be made to better advantage if the union treats as a responsible corporation, liable in damages for any breach of its agreements. While we believe that the separation of employers and employed into different, and, to some extent hostile, organizations is a misfortune for both, depriving the employer of the intelligent and sympathetic coöperation of his assistants which is so advantageous for both, at the same time that it degrades and discourages the persons employed, by separating them from those who can appreciate and reward faithfulness and intelligence, and tying them to those whose interest it is to repress industry and ambition, it is, at least, a step in advance to give the unions a character of responsibility and integrity, instead of making them nurseries of dishonesty and shiftlessness. A workingman who finds that his union maintains its agreements to the letter has received a lesson of incalculable value, not only to himself, but to the community of which he forms a part; and the spread of honesty and fidelity in the community, if it can be secured by such means, may have momentous results.

AUSTRALIA has been so long famous as the trades-union paradise that it is only fair to draw attention to the occasional notes of discord which mar the general harmony of its affairs, and to point out the possibilities of future trouble which these indicate. As every one knows, the eight-hour day, that highest good of every one who does not care to distinguish himself in this world, and does not wish any one else to do so, has for several years been established by law throughout the country. In addition to this, the unions hold complete political control, and their differences with any employers who have the temerity to resist their dictation are settled, under compulsion, by courts of arbitration, which have, until lately, practically given their decisions invariably in favor of the union men. In addition to these delights, the unions, in order to keep their members constantly employed, at high wages, have utilized their political ascendency to run the colonies, or, more properly, the taxpayers of the colonies, into debt at a frightful rate, using the money raised by the sale of bonds for public works of all kinds. When the indebtedness of the colonies reached something like a thousand dollars for each family, or about ten times the proportion of debt to population which prevails in the United States, the credulity, even of British investors, took alarm, and public works came to an end, for want of anybody simple enough to lend money for them. Then the unions, finding employment slacken, made a characteristic move. Reasoning that, if there was not work enough to keep them all employed at satisfactory wages, the remedy for the trouble was to prevent any one else from coming to take away such jobs as might be left, they passed laws, in most of the colonies, forbidding immigration. This measure, which simply strangled the natural growth of the country, did not bring much relief to their troubles, and even the courts of arbitration became so unruly as to decide occasionally against the demands of union workmen upon their employers. As the conviction dawned upon the more sensible people in the community that public bankruptcy was staring them in the face, some feeble attempt was made to postpone the crash by reducing the public expenses, so as to save money to pay the interest on the bonds. A large proportion of the voters have comfortable positions on the various public railroads, and it was thought that these could bear a slight reduction of their salaries for the common good, particularly as the operation of the railways, which were purposely built of different gauges, so as to prevent interchange of cars, and possible economies in administration and management, is extravagantly expensive. The railway hands, however, who found their berths extremely satisfactory, and knew their political power, struck against the reduction. The other union men made common cause with them, and, in one of the Australian States, the economical Ministry has already been ignominiously driven from power. What will be the conclusion of the comedy remains to be seen. It is evident that, with Australia shut off from immigration, and loaded with an overwhelming debt, there can hardly be any alternative between economy and repudiation, and the ruling class seems determined to reject the former.

PROFESSOR ARTEMIEFF, of the Technical High School in Kieff, Russia, has invented a protection against high-tension electricity which deserves to be widely known, although it was originally devised only for the benefit of Professor Artemieff's assistants in the electrical laboratory of the School. The protective armor consists simply of a dress of very fine brass wire-gauze, covering the whole body, including the hands, feet and head. The whole affair weighs only a little over three pounds, but it seems to afford complete protection, a current of any tension, and any ordinary volume, being carried off by the metal before it can reach the body. Even in the case of very heavy currents, which might be expected to heat the wire to an uncomfortable degree, the surface of metal exposed to the air is so large that the temperature is only slightly raised. In experimenting with the armor before a scientific Commission, of which he was a member, Professor Artemieff, clothed in the wire cloth, and standing on the ground, drew sparks from a wire charged with current at seventy-five thousand volts, ending by grasping the wire. The pressure of the current was then raised to one hundred and fifty thousand volts; and, as before, the experimenter drew sparks from both poles, and held both wires in his hands. In these experiments the current was derived from a transformer, supplied by a direct-current machine of one hundred and seventy kilowatts capacity. Professor Artemieff then put his hands on the electrodes of the machine, short-circuiting through his arms a current of two hundred ampères, at one thousand volts pressure. In all these trials he was perfectly protected by the wire-gauze, feeling, as he said, no effect whatever from the current.

ITALIAN TOWN-HALLS OF THE MIDDLE AGES.

COMMUNAL life has been particularly fruitful in Italy. The liberties of the communes brought to the Peninsula abundant riches, hence the period of the Middle Ages formed an epoch of active industries with us, and although time has destroyed a large quantity of the monuments everywhere, there still exist witnesses to this communal life which has been one of the popular and democratic glories of the Italian character.

The public palaces, or town-halls, are the most notable examples, and in point-of-view of monumental importance need not yield the palm to the great cathedrals. We must take a glance at this group of monuments, selecting the most important. Tuscany is exceptionally rich in them, and we will begin with this territory, which was the birthplace of Dante, Machiavelli and Michael Angelo.

In Florence, the Bargello, at present the National Museum, first draws our attention. It was the Palace of the Podestà, that is, of the highest municipal authority, who happened also to be the highest political authority. Imposing, crowned with crenellations, it was begun about 1250, and its aspect, so far as strength and dignity go, is entirely suitable for the residence of the chief man of the city. The original design has been attributed to an architect named Lapo, a fellow-pupil with Arnolfo di Cambio, the first architect of the Cathedral of Florence; but it is certain that the palace was modified in the course of the work and that popular outbreaks, conflagrations and inundations operated in such a way that the palace as we see it to-day is very far from being the one designed by Lapo, if Lapo really was its first architect, his place being taken in later times by Benci di Cione and Neri di Fioravante.

On one of the façades, near the door, about 1288, they used to paint the effigies of traitors who had contumaciously objected

Courtyard of the Bargello, Florence.

to come in and be actually hung *in corpore vili*. Amongst those who underwent this platonic punishment were the Duke of Athens and his most faithful adherents. The architectural irregularities of the façades find their correspondences in the courtyard, which is one of the most picturesque bits of architecture to be found, whether because of the majestic value of its lines or because of its coloration. The stairway, guarded by "Il Marzocco," and its rich armorial decorations are known to everybody.

The celebrity of the Bargello has not eclipsed that of the Palazzo Vecchio, which, during the time of the Florentine Republic, was at once the fortress and the official home of the Government, and was called the Palazzo del Popolo, Palazzo della Signoria and Palazzo dei Priori, because the Priori delle Arti, with their Gonfaloniere della Giustizia, constituted the executive power in the democratic organization of the Commune.

This imposing palace was begun in 1299 after the designs of Arnolfo di Cambio, who, as they say, took for his model the then recently built castle of the Counts Poppi, in Casentino, Tuscany. It was finished in all essentials in about 1314; at that time it was a lofty and crenellated quadrilateral tower-surmounted building of which nowadays we see only the two sides at the angle of the piazza and the third on the Via della Ninna, with eight windows on the north, six on the west and four on the south, with two doors on the west and north. It was only in 1308 that was begun the tower which is picturesquely placed a little to one side of the centre, for, as the story goes, they wished to make use of the old tower of the Palazzo Foraboschi, surnamed "de la Vacca." This tower is the most elegant portion of the Palazzo Vecchio, the most celebrated of the communal palaces of Italy, after the Ducal Palace at Venice.

There is no use in halting to examine the exterior, but the court and the halls should be seen, although the visit cannot be made in a moment; but I must restrain myself, and simply draw attention to the celebrated hall called the Sala dei Cinquecento, which is one of the most imposing and successful architectural and decorative compositions to be found in all Italy. Built for the Grand Council of the people in consequence of the demands of Girolamo Savonarola, the reformer frequently preached in it. Moreover, this hall of the Cinquecento was to be decorated by Leonardo and Michael Angelo, those two immortal masters who, in fact, did some work on it in 1504. Leonardo was to paint the Battle of Anghiari, and Michael Angelo the Battle of Cascina, but neither the cartoons nor the works themselves nor the beginnings of the frescos have remained for us. There is only the description given by Vasari, a writer and artist of the sixteenth century, who, entrusted with the general renovation of the Palazzo Vecchio, with the aid of several artists, left it a very treasury of the imagination.

More elegant than the Palazzo Vecchio, although less characteristic, is the Palazzo Or San Michele, also in Florence, at once a church and a palace, which externally is rather a palace than a church or oratory. A loggia forms the beginning of this edifice, and this loggia was built, about 1337, on the foundations of a still older one, erected for the grain-trade in 1280. It is not certainly known who was the architect of the new building, and it is likely that it was Taddeo Gaddi, but I believe that the famous Francesco Talenti, who, being the architect of the Cathedral of Florence and of the campanile now known as Giotto's Campanile, enjoying at that time a great name, had some part in rebuilding this structure, with its fine mouldings and its cornice supported on consoles — a magnificent crowning and one wholly proper to a Florentine monument. However this may be, Or San Michele bears witness to a feeling for monumental effect which the Florentines of those times possessed. It is not in fact, however, a communal palace, but it has all the air of being one, and because of this I mention it here.

A building still more clearly stamped as a communal palace is that at Pistoja, near Florence, and I know nowhere in Italy a palace more grave, more massive, more serious than this one. Begun in 1294, by the Podestà Giano della Bella, it was finished about 1353 in a pointed style which has none of the elegance proper to that style. The exceptional gravity of this palace may have been corrected by a polychromatic decoration, of which the late G. Gailhabaud, after documents which were furnished him by a French architect, the late M. Laval, presented the model in his monumental publication, "*L'Architecture du V au XVIII Siècle.*" The Palazzo del Comune at Pistoja, according to this restoration, originally had its windows decorated with painted leafage and its walls worked *en bossage* separated by red lines, and if this decoration really existed it is certainly an important example of polychromy applied to architecture. But all this is a dream. M. Laval made one of the most deplorable mistakes that an architect travelling in search of documents to publish has ever made. I can assure him, for I have made researches in this connection, having studied long ago the restoration of the Palace at Pistoja, that my researches justify me in saying that the illustration inserted in the work of the above-mentioned French author is nothing but a solemn farce.

Since one often takes pleasure in contrasts, I beg you to consider, side by side with the Palazzo del Comune at Pistoja, that at Siena, "the red city," as M. Bourget calls it. This city, entirely filled with Gothic buildings of the fourteenth century, so full that no city in the north or centre of Italy — Florence or Venice, or even, in foreign lands, Bruges or Nuremburg — is richer in this respect, this city possesses the most elegant communal palace in the entire Peninsula, and its slender tower, which makes one think of the most sky-piercing minarets of the Orient, this tower of brick and stone, could not be more light and poetical; surely, it is one of the finest of its class in all Italy. But the building itself, which rises on the Piazza del Campo at Siena, has an *ensemble* of a marked and picturesque character; a character due in part to the details, the doors and windows, the greater part of the latter separated by colonnettes. One must notice in the Sienese pointed arch that its function is merely decorative; there is often below it a discharging-arch, usually segmental, which gives to the Gothic system of Siena, and only of Siena, a *cachet* which is altogether individual.

Just as I have said in the case of the Palazzo Vecchio at Florence, I will say here, that the courtyard (in process of restoration at present) and the halls, likewise, have an interest of the highest order for artists and visitors careful to inform themselves as to the whereabouts of the beautiful things in Italy. The halls of the Palazzo Pubblico at Siena constitute a veritable museum where frescos by the most eminent painters of the Sienese school are intermingled with works in wrought-iron and carved furniture. The frescos in particular cannot catch the eye of the visitor without his acquiring a very distinct impression.

The Palazzo Pubblico of which we are speaking is the most important and majestic of a group of Sienese palaces, private monuments in stone and brick; as, for instance, the Palazzi Salimbeni, Buonsignori, Tolomei, Saracini, and so on, which have rather the air of fortresses than of private habitations, and maintain a rivalry with the public buildings of the time.

The architecture of these palaces is of the purest simplicity and modesty, exteriorly, while within, on the contrary, everything was luxurious. I say "was," for the interiors of these seigneurial habitations have been everywhere defaced. Italy deplores these defacements, but proper restorations cannot be made every day, and Siena has good reason for bewailing several "restorations" that have been made.

From Tuscany passing into Æmilia we find in our way Bologna and Piacenza. At Bologna is a remarkable Palazzo Comunale, which makes us remember that this city — the *alma mater studiorum*, somewhat like Oxford, in England, and Boston, in the United States —

during the first half of the fourteenth century gave birth to a dynasty of eminent architects, the Fioravanti, who practised architecture at home and abroad; and to Fioravante Fioravanti is due the honor of having prepared the designs for the Palazzo Comunale and the court, whose imposing tower exercises a certain influence on the imagination. Far more important in its entirety and its details is the Palazzo Comunale at Piacenza, one of the finest models of Gothic architecture in brick in Italy. To tell the truth, this building, called "Il Gotico di Piacenza," is of mixed material. Its most interesting parts, the windows, are of brick, and these are the parts which give character and importance to the edifice. These windows have all the richness possible to brickwork, and the building is of all the town-halls in Italy the most highly decorated. Begun in 1281, it had several architects — Pietro Burgeto, Pietro Cagnano, Gherardo Campanario and Negro dei Negri; interrupted during the overthrow of the communal liberties, the façade which faces the grand piazza is only one of the four divisions of a building which was intended to enclose the courtyard, but of which nowadays we see only this part, although traces exist of the foundations.

"Il Gotico di Piacenza" below-stairs consists of an open vestibule on stone piers which leads to the courtyard, particularly important because of its details, and far from being equal on every side with the exterior. The palace has a façade, or a side, the left, where there is to be noticed a treatment of the windows surmounted by a rose window and a gable, with interlacing arches, constituting a perfectly harmonious treatment.

If I were to speak of communal palaces which were also fortresses, I should be apt to speak of the celebrated Castello dei Rocche at Finale in Æmilia amongst others, but they would form a subject which might better be treated elsewhere, as I should like to do.

Surely there exists nowhere in Italy a communal hall which can equal the glory of the Ducal Palace at Venice; the Palace of the Doges is the most beautiful of its kind in all Italy. Although the palace is very well known, my task is no less important, for the history of the Ducal Palace has almost always been based on imperfect data and on tradition rather than on serious documents.

The Ducal Palace at Venice, which rests against the right flank of the Golden Basilica, just as the Vatican rests against the right flank of the Basilica of St. Peter, has a very remote beginning. The first palace was erected in 814 by Agnello Partecipazio at a time when the ducal seat was transferred from Malamocco to Venice. A conflagration having reduced it to deplorable conditions in the time of the conspiracy against Candiano IV, the palace was restored by Pietro Orseolo in 976, then, ruined again by fire in 1105, it was rebuilt by the doge Ordelafo Faliero, and when the power was in the hands of Sebastiano Ziani it was enlarged, in 1173, and the works were carried on to 1340, when the rebuilding on the side of the Molo was begun, after designs, as obscure tradition has it, of Filippo Calendario; these works were carried on to 1355, resumed again in 1362, and finished in 1365. In the following century, or, to be more exact, in 1424, the façade upon the Piazzetta was begun, and finished in 1463 by such artists as Andrea da Milano, Giovanni and Bartolomeo Bon, the authors of the celebrated Porta della Carta, the Venetian master Pantaleone Bon and other sculptors and Tuscan ornamentists; then, in 1483, because of another fire, and later, in 1577, again because of a fire, the palace needed important repairs, which were carried out. All this shows that the Ducal Palace, far from being a Gothic construction of the Gothico-Oriental character common in Venice, is a mixture of styles, Gothic without, Renaissance within. So far as the details are concerned, there should be noticed the beauty of the capitals, carved by several artists, capitals of the porticos ornamented with leafage and figures which I myself have endeavored to study and explain in my "*Ornamenti dell' Architettura*," Vol. II, Page 85 and following, describing the capital of Justice, at the angle of the palace near the Porta della Carta, a *chef d'œuvre* of sculpture, the most beautiful capital that Italy can produce, signed by two Florentine artists. The chief artists who, at the time of the Renaissance, labored on the Ducal Palace were Antonio Rizzo, to whom we owe the celebrated Giants' Staircase, Pietro Lombardo, or Solari, and Antonio Abbondi, called "Il Scarpagnino." I need not speak of the romantic Bridge of Sighs which connects the Ducal Palace with the prisons, the work of Antonio Daponte (end of the sixteenth or beginning of the seventeenth century), nor of the façade on the Court of the Orologio, erected after the design of Bartolomeo Monopola, for the sake of enlarging the field of my present researches. Rather, I will point out the great beauty of the halls. Tiziano, Tintoretto, Paolo Veronese, Palma il Giovane are the painters of our palace, and their paintings and frescos are interwoven with carved marble doorways and chimneypieces, with bronzes and hangings, especially in that famous hall called the Sala del Maggior Consiglio, the most imposing room in the Ducal Palace, with Tintoretto's "Paradiso" and the "Glory of Venice" by Veronese, which taken together form an architectural and ornamental whole which produces a powerful impression.

Let us hope that the fear aroused in 1898 over the compromised stability of the Ducal Palace may be forever removed, as just now it seems as if it might be, and let us hope that the recent disaster to the Campanile of St. Mark may not have a sequence in the palace, which for several years back has been undergoing reinforcements and the lightening of the loads imposed on its foundations.

The Ducal Palace has been the object of recent restorations, the most memorable being the ones carried on with regularity from 1876 to 1889. There was at that time a kind of general reorganization, the decorative side concerning itself particularly with the exterior capitals, several of which were cut over amidst much opposition, particularly from Ruskin, who demanded that the old capitals should be replaced with plain uncarved blocks of marble. The restoration of 1873–89 is also memorable because of an ingenious wooden scaffolding invented by the architect Forcellini and used in the restorations.

Following now along the northern road while moving away from the Adriatic, I shall not halt at the ancient Broletto, or Arengario, at Monza (twelfth century), or at that of Brescia (begun in 1187), the one at Milan (thirteenth century) or that at Como (twelfth century), it being more agreeable to halt at Cremona, whose Communal Palace is a very imposing bit of brick architecture. Its origin is unknown, but it is certain that in the first years of the eleventh century a communal palace existed at Cremona, but the documents which relate to it do not necessarily refer to the present building, which does not date earlier than 1200; in fact, the front portion, on the piazza, was erected in 1206, and the façade of the court in 1245. Restorations have modified and disfigured it, and yet its Gothic character is very marked.

Cremona possesses another very remarkable Gothic building, the Palazzo di Gonfalonieri, which reminds one of "Il Gotico di Piacenza." This building was erected in 1292 by the captains of the army of citizens, and later was the seat of the jurisconsults, or advocates, from whence is derived the modern name of "wolf's staircase."

A Gothic palace which should not here be overlooked is the one which in the first years of the fourteenth century Guido Buonacolsi built at Mantua, carried on later from 1328 by the Gonzagas. Exteriorly, it preserves fairly enough its ancient lines, but within it has been wholly modified during the time of the Renaissance. The palace that I speak of is the celebrated Ducal Palace of Mantua, which recalls to us an heroic page in the history of our national painting, for it was here that the best artists of the fifteenth and sixteenth centuries executed their never-to-be-forgotten frescos and paintings from the time of Mantegna to Giulio Romano, and other exquisite performers in stucco decoration, marble and ebony-work here carried out work which even to-day excites admiration.

The interior of the Ducal Palace is, however, in great part in a most deplorable condition, but amateurs still find here reason enough for leaving the spot with their minds filled with sweet memories.

The North still calls us on to Genoa, where the Palazzo de S. Giorgio is one of the most precious monuments of this grand maritime city. This palace, which was built quite near the harbor on the *quai* bordering the sea, where the movement is intense, agitating, is always provoking long and interminable discussions on the necessity of surrendering a portion of itself to the demands of the merchants; but it has been resolved, in opposition to the demands of these gentlemen, that the Palazzo di S. Giorgio should remain as it was built by the Genoese powers of the thirteenth century, in the time of Guglielmo Boccanegra, by one of the most estimable men of his epoch, Father Oliviero dei Cistercensi (of the Carthusian brotherhood).

I have not yet spoken (now I am proceeding downward to the centre of the peninsula) of the Communal Palace of Perugia and the Palace of the Popes, or Soliano, at Orvieto, an elegant work due to the initiative of Pope Boniface VIII (1294–1302); nevertheless, properly speaking, the Gothic palace at Orvieto, while having all the air of a communal palace, does not come within the purview of my researches. So, limiting myself to the palace at Perugia, I will only mention its solemn air. Uncertainty veils its origin: it appears likely that its first architect was Father Benvignate da Perugia, (died 1310), who must have begun it in 1281; and this same palace has been the subject of a lively discussion because of a semicircular staircase which they wanted to plant against its façade. But my readers will be less interested with this discussion than with knowing that in the interior of the palace there exists a large hall, very richly decorated with frescos, an ornamentation which, unfortunately, has been over-restored in our days. Yet, this decoration is of a remarkable type for a hall of the Middle Ages. Without going far from Perugia, I will mention the Communal Palaces at Todi and Gubbio, sufficiently well known in Italy, particularly the latter. The palace at Gubbio, called "Dei Consoli," is generally attributed to Giovannello, surnamed "Il Gattapone," but this is a mistake, for the palace was built by Angelo d' Orvieto, who lived in the first half of the fourteenth century: the name of Gattapone has been brought forward without rhyme or reason, while the name of Angelo d' Orvieto is actually found engraved over the entrance to the palace.

If, leaving the communal palaces, I might enter on a consideration of the profane buildings of the Middle Ages, I should speak of Apulia. Abruzzi and Sicily, and I might mention the castle of Ortona de Marsi, the Castel del Monte, the Palazzo Tabassi at Sulmona, the elegant appearance of the Badia Vecchia at Taormina, a Gothic structure of the finest; and the Osterio, grand and small, at Cefalù, falsely attributed to the times of Roger II; but, since I must hold to my subject, I must bid farewell to my reader, content if my notes have interested him.

ALFREDO MELANI.

PARIS ARTS AND CRAFTS SCHOOL. — The erection of a school of arts and crafts has been decided upon by the Paris municipality, says the London *Times's* correspondent in the French capital. A spacious site has been chosen on the Boulevard de l'Hôpital. The school will cost 5,000,000f., the State contributing one-fourth of this amount.

SOUND-PROOF PARTITIONS.

THE subject of "fire-resistant partitions" and of "heat-resistant coverings for wooden surfaces" has long since been investigated on behalf of the Factory Mutual Fire Insurance Companies. There are many places in factories where it is desirable to put up partitions sufficiently light to be supported on the timbers without the necessity of building from the foundation. There are also many stairways, elevator-wells and belt-chambers in mills, where it is desirable to put up a fire-resistant partition without going to the heavy expense of encasing them in brick.

The materials and method of constructing such partitions vary with the conditions in each case. Thin metal, plastering on wire laths, expanded metal and other methods have been applied in different cases.

Among the heat-resistants, the Sackett's Plaster Board proved to be one of the most effective for covering wooden surfaces or partitions made of plank. This material is made ¾ inch in thickness and may be made thicker. It consists of four layers of felt and three layers of magnesium plaster. It is made in large sheets and may be fastened up in various ways at a moderate cost. It is then covered with "brown plastering" so-called, and finished with a skim coat of hard plaster. The partition occupies very small space; some which were put up in the office occupied by the undersigned, about two years since, without interfering with the daily work in any considerable measure, have proved to be free of cracks or any discoloration, taking up very little space. In this instance, the plaster board was nailed to seasoned wood-studding.

So far as we could judge, this material also retarded the passage of sound.

When the subject was submitted to Professor Norton by the architect in charge of the construction of a dormitory or dwelling-place for students in the New England Conservatory of Music, arrangements were made for including this material with others. The report of Professor Norton is herewith submitted.

Cabot's Quilt, recommended in connection with this material, is made of dry seaweed, padded between two thicknesses of paper, which, in buildings of fireproof construction, should be asbestos paper.

The architect in charge of the construction of the building of the New England Conservatory of Music, in which instruction is to be given, has adopted a partition of the Keystone Fireproofing Co.'s blocks with the Cabot's Quilt between the two sections.

These buildings are both approaching completion, so that ere long a practical test will be possible by which the relative sound-proof quality of each partition may be determined.

Respectfully submitted, EDWARD ATKINSON, *Director.*

BOSTON, MASS., August 8, 1902.

REPORT OF CHARLES L. NORTON: SOUND-PROOF PARTITIONS.

The subject of partitions for fireproof buildings is one which has led to much investigation, especially by the New York City Building Department.

When it is desired to make a partition which shall be reasonably sound-proof, it is apparently necessary to diminish somewhat the absolute incombustibility of the partition, though to a less extent than was supposed.

The following account of tests made for Mr. Edward T. Barker, architect of the dormitories of the New England Conservatory of Music, will show the relative values of some of the typical partitions of sound-proof separations between rooms: —

There were built upon the concrete floor of the B. & A. warehouse, East Boston, five rooms, 7 feet square, whose side walls were made of the several partitions. The rooms were built upon a floor of the same kind as that which is to be used in the buildings for the students of the Conservatory, for which the results of these tests were especially desired.

The rooms were built near one another on the fifth floor of the warehouse in a large loft or room about 50′ x 70′ long and 9 feet high. The ceiling of each room was the under surface of the concrete ceiling of the large room. Each room had a floor of two thicknesses of ⅞-inch floor-boards with *two* thicknesses of Cabot's Sheathing Quilt between the floor-boards and the concrete slab of the main floor. On one side of each room was a door with a glass panel, the door-jambs being faced with soft felt, and the bottom of the door was fitted with a stop, or "weather-strip," operated when the door closed, making a tight joint at the bottom.

The side with the door will be referred to as the front in the following description: —

Room A: This room was submitted by the National Fireproofing Co., and its four sides were made of terra-cotta blocks. The front and back walls were made of blocks 4 inches thick; the sides of 2-inch and 3-inch blocks. After the blocks were in position the room was given two coats of plaster inside and out.

Room B was submitted by the Keystone Block Co., and its four walls were made of the blocks of the Keystone material of the nature of plaster-of-Paris with a fibrous bond. The front wall was of blocks 4 inches thick, and the left side was of blocks 2 inches thick, the back of blocks 3 inches thick, and the right side of two 2-inch blocks with a 2-inch air-space between them. The entire room was given two coats of plaster inside and out, except the front, which had no plaster on the outside of the blocks.

Room C was submitted by the Sackett Wall Board Co. and was built of Sackett Plaster Board ¼ inch thick, wired upon both sides of 3-inch steel channels. The channel truss or studs of the back and right side were wrapped with felt about ⅛-inch in thickness before applying the plaster-board. The Sackett Plaster Board is a composite board of alternate layers of paper and plaster, the whole being about ¼ inch thick. This room, like the other, was plastered inside and out, but to a slightly less thickness.

Room D was submitted by J. Russell & Co. and was of a more complex construction. The left side was a solid partition of metallic lath and plaster. The ⅞-inch steel ties were spaced 16 inches on centres, metal lath was applied to one side only of the ties, and then plastered to a thickness of 2 inches. The rear wall was built upon two rows of ⅞-inch studs staggered. Between them were placed one thickness of waterproof paper about $\frac{1}{32}$ inch thick and metal lath was wired to both sides of the row of studs and given two coats of plaster. The right side was of the same construction with a layer of ⅛-inch felt between the two thicknesses of waterproof paper. The front wall was of metal lath on two rows of staggered studs, with Cabot's Seaweed Quilt between the rows of studs.

Room E was submitted by Mr. Samuel Cabot, and was wholly of metal lath and plaster double partitions, with the space between the lath filled with Cabot's Sheathing Quilt. The front and left sides contained three thicknesses of quilt, and the right side and rear two thicknesses. The quilt was placed between the studs and the metal lath, and where three thicknesses were used, one was between the row of studs as well.

The rooms had been vigorously dried for several days, none longer than a week, but the whole building was so damp and the time so short that no considerable part of the plaster and none of the interior portions of the partition were dry. The Sackett Board room was the driest and Cabot's was the least dry.

The preliminary trials showed so great a range of efficiency of the several constructions that the microphonic apparatus, which was designed to make rapid comparisons of sound intensity possible, could not be used. Reliance had to be placed wholly on listening with and without a felt-mouthed stethescope at the outside of the partition to sounds of various quality and intensity from within. The notes of the piano, violin, cornet and the human voice were carefully tried throughout wide ranges of pitch and intensity. The performers and the instruments were interchanged, every possible chance of unfairness, due to the variations of intensity in the sounds used, was eliminated. Of course, no interchange of the positions of the room was possible. No electrically-driven tuning-fork could be used for producing sounds of constant loudness. The insulating property of some of the partitions was so good that even the blare of a cornet or the overpowering tones of an Italian tenor, drawn from the ranks of the laborers on the building, could be heard through the partition, except by careful listening within a few inches of the wall.

After much consideration, the writer has given the following ratings to the different partitions. The order of their standing upon the list indicates their efficiency as compared with those above and below them.

No.	Room.	Side.	Scale.	Composition.
1	E	Left	100	Cabot's Quilt, 3 thick + metal lath.
2	E	Right	95	Cabot's Quilt, 2 thick + metal lath.
3	E	Rear	95	Cabot's Quilt, 2 thick + metal lath.
4	C	Rear	85	Sackett Board, 2 felt on ⊏ s.
5	C	Left	85	Sackett Board, 2 felt on ⊏.
6	C	Right	80	Sackett Board, 2 felt.
7	D	Rear	75	Metal lath + paper.
8	D	Right	75	Metal lath + paper + felt.
9	B	Right	60	Two 2″ Keystone Block with 2″ air-space.
10	A	Rear	50	4″ National Terra-cotta Blocks.
11	B	Rear	50	3″ Keystone Blocks.
12	A	Right	45	3″ National Terra-cotta Blocks.
13	B	Left	40	2″ Keystone Blocks.
14	A	Left	40	2″ National Terra-cotta Blocks.
15	D	Left	30	2″ Metal lath, solid plaster.

Nothing more is to be inferred from the numerical efficiencies than that the first partition is about three times as good as the last, and that the numerical interval between any two partitions on the list merely indicates the order of magnitude of the difference between the partitions.

The partitions making up the rooms submitted by Samuel Cabot and the Sackett Wall Board Company were the most efficient; but it is distinctly to be borne in mind that no other room had so easy a test as did these, in that each of the others had one thin and ineffective side which transmitted sound to the sides adjacent to it. The thin side of the Keystone room was noticeably resonant and plainly rendered it impossible to make a fully satisfactory test of the air-space partition. The solid metal-lath plaster partition of the room submitted by J. Russell & Co. acted in the same way in that room.

I do not believe, however, that this defect in the structures has caused any changes in the position on the efficiency list of the Cabot and Sackett rooms.

The efficiency of the Cabot Quilt as a material for rendering the partition "sound-proof" is so clearly demonstrated in these tests that I recommend it for use in the partitions for which these tests were made. The nature of the material in which the Quilt is encased should be carefully considered. I do not think it within the province

of this report to discuss the partition from other than acoustic considerations, and as an encasing medium the most effective material is Sackett Board and Adamant Plaster.

I would, therefore, give as my opinion that the best acoustic results would be attained by using a partition of Sackett Board and plaster with two thicknesses of Cabot's Quilt between the plaster-board.

I should recommend a wooden stud rather than steel channels, if the fire-risk is not materially increased thereby.

As later tests showed, some sort of a suspended ceiling will be needed, as the concrete slab transmits the sound across the top of the partition readily. No trouble will be given by the sound passing through the concrete to the rooms above or below; but, unless a layer of Cabot's Quilt, with under-lath and plaster, or of Sackett Board and plaster be put on the under side of the concrete ceiling, the efficiency of the partitions will be diminished somewhat.

The front walls could not be tested because of the leaks around the door and through the door-frames, even where covered with a large shutter padded with Cabot's Quilt. It is evident that a double glass door will be needed. The floor construction is acoustically good. Respectfully submitted, C. L. NORTON.

IS THE ARCHITECT A BLACKMAILER?

THE following remarks, published in last week's issue of the *Record and Guide*, so entirely coincide with opinions which we have more than once expressed on the subject of exhibition catalogues, that we gladly take the opportunity to reprint them with permission, for the sake of showing that we are not singular in entertaining them: —

It has long been recognized that one of the greatest obstacles to reform is the timidity of the suffering and the virtuous. Those people who suffer most from an abuse, as well as those who are most familiar with its operation, refuse to lift up their voices in public either for the benefit of themselves or their fellows. They vociferate secretly and denounce privately, but when called upon to give effective testimony, in order to secure the punishment of rascality, or the correction of an evil, they shirk the ordeal with a cowardice that makes the spectator respect even the crime or the oppression of which the victims themselves complain.

Every newspaper-office is thoroughly familiar with this reformer "without a name" — this man who, in regard to public abuses, would write letters, which he will not sign, this civic weakling, willing to give important evidence only on condition that his incognito is sacredly preserved.

For some years past the *Record and Guide* has been hotly importuned by a number of building-material firms and others in this city in regard to what they are pleased to call the "blackmail" practised by the architectural profession in general. This "blackmail," it is alleged, is exerted in many ways, through the medium of exhibitions, catalogues, commissions, but depends, in all cases, essentially upon the fact that the architect, as purchasing-agent for his client, considers himself entitled to "propitiation" from the building-material houses with which he deals, thus making it at least dangerous to refuse tribute to the enterprises, schemes or interests which receive his endorsement, or with which he happens to be connected.

A building, let us say, is erected. As soon as it is finished a prospectus or catalogue is produced, describing the building, illustrating the street-front and giving floor-plans. The architect supplies the drawings. His name figures prominently in the pages. Every contractor or building-material firm who has done a dollar's worth of work or supplied a dollar's worth of material is solicited for a contribution under the guise of "advertising." Some firms contribute perhaps $50 or $100. The outlay stands on the books of the building-material firm as an expenditure for advertising, but it is regarded by the house strictly as "backsheesh."

"Scarcely a day goes by now," complains the manager of a large concern, "without our being called upon to 'stand and deliver,' in the name of some architectural exhibition, some annual catalogue, some club or society publication or architects' pamphlet. In many cases we are given plainly enough to understand what is expected of us. In other cases, the 'blackmailed' hand is gloved, and all we see is the names of a number of leading architects placed on a letter-head, soliciting, mark you, soliciting our advertisement! I have one such letter now before me.

"Sometimes these schemes are boldly entrusted to advertising-agencies. Frequently, indeed, they are actually farmed out to these people. I could tell you, and so could others tell you, of how the names of apparently honorable men in the profession have been used by these agencies in a way that would make the owners blush for shame."

Another firm whose book-keeping methods possess the virtue of candor have actually opened an account headed "Blackmail." We had the privilege of looking at it recently and found among the items the names of several highly respected architectural and building organizations in different parts of this country where the firm had a considerable market. In speaking to one of the officers of the company, we were told: "We are merely waiting until the evil reaches the breaking point. It is fast getting there. It is something like the Tammany police system; it doesn't pay any one individual to fight it alone. It is cheaper to grin and sign a check for the petty larceny. Last year we were called upon to pay out something like $2,000 for 'exhibitions,' professional catalogues, organization publications, and the like.

"I cannot believe that the honorable members of the architectural profession and the building-trades realize what is being done with their apparent sanction. It is time they did. If, in the judgment of these people, it is desirable to hold annual exhibitions, issue club publications and print catalogues, should it not be done at the cost of the beneficiaries? Take for instance, these architectural exhibitions that are held in the chief cities of the country. Is not every one of them carried on mainly at the expense of building-material firms? The architect will tell you he doesn't advertise. Oh, no! Such a commercial method of seeking fame is unprofessional! Nevertheless, he permits his agents to approach building-material firms in his name, extract money from them, and then, with that extorted cash, he exhibits his own drawings to an admiring public, thus obtaining in an indirect way and at the expense of others, the publicity which he is not candid enough to say he appreciates, or independent enough to pay for from his own purse."

These are serious indictments. We believe that no one will more quickly or more honestly repudiate them than our architects and builders themselves. But that is only the personal side of the matter. The fact is, the evils complained of have developed through a certain moral carelessness or a certain financial optimism, which makes people when associated for a common purpose other than a directly pecuniary one somewhat incurious as to the exact source of the dollars that come to them. Moreover, there is a certain specious side to the situation that may well blind an insensitive person. No one, it may be said, is bound to advertise in these catalogues or contribute to these exhibitions. There is no compulsion. If firms sign a contract for advertising-space, presumably it is because they deem the publicity they get of a value equivalent to their cash. This argument is fallacious. It doesn't touch the realities of the case. Similar statements might be made regarding the tyranny of the tipping-system and of all other forms of general blackmail. In all these extortions people "put up" as though their payments were really voluntary, but essentially, there is coercion, and every man feels it. The men who canvass for these schemes might indeed repudiate the word "blackmail," yet they all know very well how much power there is in "suggestion," and do not delude themselves for a moment that they are engaged in presenting a thoroughly business proposition to those who give them an audience. They know there is an uncommercial element in the proposition, and they know that it is just that very uncommercial element that is most potent in obtaining the signatures to the contracts from which these architectural, building and other societies derive the benefit.

The truth of the situation could very easily be discovered by a small committee, intent upon getting the truth, were they to visit fifty of the chief victims in this city alone, and have with them a private, candid and quite unperfunctory conversation. They would learn enough to enable them to make a report that would cause every honorable man to withdraw his name from these exhibitions, publications and catalogues, in which the real beneficiaries are not the persons who pay the bills.

The architect is prone to talk much of his professionality. The most professional step that is open to the architect of this country today is to rigorously pay his own bills for the exhibition of his own drawings and to cease farming out his professional dignity and his professional name for a price. This is about equally true of builders throughout this country, though, of course, for reasons not concerned with professional ethics. It is also true of labor organizations. They are all offenders. Yet the offense from every point-of-view is a mistake. No good cause is really served by contributory petty enterprises based on extortion. It is time a stop were put to the evil. It has attained great proportions. It is much talked of and inwardly opposed. But "publication" is another matter, and complaints and appeals are forwarded to the *Record and Guide* only on condition of secrecy. We hope yet to remove that, or, rather, conditions are now so near to the point of intoleration that it will be cheaper to speak out than to pay up.

BOOKS AND PAPERS

IT it not easy to write anything very original upon the subject of steam-heating and ventilation, for while it is quite possible that such writers as Baldwin, Mills and Carpenter have not uttered the last word upon such subjects, it is nevertheless almost inevitable that any new work should follow the same lines that these authors have beaten out so well and should of necessity constantly refer to them as standard authorities. This recent addition to the technical library on the subject [1] was originally written as a series of articles for the *Engineering Record* and has been somewhat revised for its present form. The subject-matter is treated simply and in a perfectly comprehensible manner and the principles of the science and application thereof are set forth in such a manner as to be readily available, and while in no sense exhaustive or strikingly original, it is a trustworthy guide to the practice of those who have this sort of work to do. Heating and ventilation is essentially a practical science in which it is safe to say that more depends upon knowledge of good practice

[1] "*Steam Heating and Ventilation.*" By William S. Monroe, M. E. Price $2.00. New York; *The Engineering Record*, 1902.

than of the theory, especially as all the theories relating to the proportioning of heating-surfaces are almost purely empirical. The author admits the lack of usual information in regard to this branch of the subject, but it is to be regretted that he could not have managed to collect in available form some of the experience which has certainly proved satisfactory in the past. In the earlier days of steam-heating radiating-surfaces were generally figured by rule-of-thumb methods based upon the cubic contents of the space to be heated. The writer gives considerable study to the endeavors to devise a more scientific method of analysis which would take account of the loss of heat through different mediums and through different kinds of construction, but at the best such methods of analysis have little tangible value unless they can be substantiated by actual observation, and in ordinary practice it is found on the whole quite as safe, and far easier, to lay out the radiating-surfaces in proportion to the cubic contents of a room, varying the proportion to meet the varying requirements. It is safe to say that no one, however well posted theoretically, could be trusted to design the heating-apparatus for a large building unless he has had practical experience.

It is to be regretted that the writer seems to advise the concealment of risers in fireproof buildings. This is a thoroughly bad practice and is not to be defended even upon the score of looks, while from every practical standpoint the risers should never be concealed except in vertical ducts which are readily accessible.

On the whole, the work is a concise, practical manual embodying and illustrating the best of the common practice.

Mr. Cain's work on the Theory of Steel-Concrete Arches [1] is the best and most available treatise upon the subject which has come under our notice. The analyses of the strains in an arch are necessarily worked out in a more or less empirical manner and assumptions have to be made as to lines of action of forces which are doubtless not in exact accordance with the real conditions, so that the solution of the strains in an arch is indeterminate, but the reasoning is very logical and gives results which are trustworthy, while the methods are, on the whole, the best which we have seen presented. The book is to be commended to all who are interested in this kind of work.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE DUCAL PALACE, VENICE, ITALY; — PALAZZO PUBBLICO, PERUGIA, ITALY.

For description of this and the following plates see article "Italian Town-halls of the Middle Ages" elsewhere in this issue.

PALAZZO DE' CONSOLI, GUBBIO, ITALY: — PALAZZO APOSTOLICO, ORVIETO, ITALY.

PALAZZO DEL PODESTÀ, FLORENCE, ITALY; — PALAZZO COMUNALE, TODI, ITALY.

PALAZZO COMUNALE, CREMONA, ITALY; — PALAZZO COMUNALE, PIACENZA, ITALY.

PALAZZO DELLA SIGNORIA, SIENA, ITALY; — PALAZZO VECCHIO, FLORENCE, ITALY.

PALAZZO DEL COMMUNE, PISTOJA, ITALY; — HALL OF THE FRATERNITY OF ST. GEORGE, GENOA, ITALY.

[The following named illustration may be found by reference to our advertising pages.]

THE LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO.: A CORNER OF THE TEXTILES BUILDING. MESSRS. EAMES & YOUNG, ARCHITECTS, ST. LOUIS, MO.; — THE FINE-ARTS BUILDING. MR. CASS GILBERT, ARCHITECT, NEW YORK, N. Y.

The Textiles Building is situated to the left of the main lagoon, and this and the Electricity and Machinery Building are the only two buildings facing the Grand Basins with the cascades and approaches to the terrace crowning the hill on which the Art Building stands. While not the largest in area, the building fronts 525 feet on the main thoroughfare of the Exposition. Its position makes it one of the most conspicuous buildings, in what has been called the "Main Picture" of the Exposition. The four elevations are similar in character, varying only as required by the irregular shape of the ground plan. The interior court will follow the general outline of the buildings in form and style, and will be laid out in the form of a plaisance or garden of a formal type. It is estimated that the cost of this building will be about $600,000. It will be wholly temporary in character, and will be constructed of staff, or other similar material.

The Art Palaces consist of a group of three buildings, having a total frontage in the northwest façade of 836 feet. The middle building is 166′ x 348′ and is of the most substantial and enduring fireproof construction. This building will contain a hall for statuary 94′ x 157′, with an arched ceiling 51 feet high. Picture-galleries will have places on either side of the sculpture-hall. The two pavilions at either side are of temporary construction, each being 200′ x 422′ in size. Each will stand 44 feet from the central building. A court 262′ x 530′ south of the central building, enclosed on three sides, will receive a rich decoration in landscape effect and will be one of the many delightful resting-places to be found in the Exposition. The lighting of the buildings will be principally from clerestory windows, so that the entire interior side-wall space may be available for pictures.

[Additional illustrations in the International Edition.]

COMMUNAL HALL, PIACENZA, ITALY: SIDE VIEW.

For description of this and the following plate see article "Italian Town-halls of the Middle Ages" elsewhere in this issue.

HALL OF THE JURISCONSULTS, CREMONA, ITALY.

COMPETITIVE DESIGN FOR THE CITY-HALL, NEWARK, N. J. MESSRS. RANKIN & KELLOGG, ARCHITECTS, PHILADELPHIA, PA.

ELEVATIONS AND SECTION OF THE SAME.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A VOICE FROM THE COAL REGION.

Wilkesbarre, Pa., September 30, 1902.

To the Editors of the American Architect: —

Dear Sirs, — I wish to thank you for the sane articles on the strike question which are in the September 27th number of the *Architect*. If the newspapers in general and the parsons and philanthropists so-called could profit by them it would be a blessing indeed. So few people outside the coal region understand the fight for American liberty which the operators are maintaining, or have any sympathy with the men who want to work and are not allowed to do so, that it is refreshing to find some one who understands the whole situation.

Gratefully yours, An American Woman.

NOTES AND CLIPPINGS

Light and Air in Cities. — In New York the importance of the light-and-air question is now pretty well understood, though it has been egregiously overlooked in several instances; and the result is that large office-buildings are attempted only on especially favorable sites, the majority of which have already been preëmpted. The influence of the Trinity churchyard, in affecting realty valuations, is an interesting case in point. Here is an open green square in the heart of the financial centre, which sentiment and tradition have made consecrated ground; which the wealthy proprietary corporation refuses to sell at any price; and which, as far as can now be seen, will always remain in its present state. Consequently, the office-buildings erected on abutting property are assured of a splendid supply of light and air for an indefinite period. It is for this reason that the Empire Building, on the south side of Rector Street, is one of the most successful enterprises in the Metropolis; and it is for this reason that the old Trinity Building, at 111 Broadway, is regarded as probably the most available building site in the lower business district. — *B. J. Hendrick in the October Atlantic.*

Difficult Engineering in the New York Subway. — Mr. Frank W. Skinner of the *Engineering Record* has a paper in the October *Century* on the above topic, in which he describes the running of the subway under the Columbus Monument, and the moving of a tunnel. He also gives this account of the relocating of a long, thin, high wall: "An ordinary derrick will handle compact loads of 3, 5, or even 10 tons; a 100-ton load is about the limit of the capacity of the heaviest steel ordnance cars drawn by powerful locomotives, or of the largest hydraulic jacks, which will lift it a few inches so slowly that the motion is scarcely perceptible. A building weighing 500 tons may be carefully braced and lifted up or moved laterally with rollers on smooth level

---

[1] "*Theory of Steel-Concrete Arches, and of Vaulted Structures.*" By William Cain, Member Am. Soc. C. E., Professor of Mathematics, University of North Carolina. Second edition, thoroughly revised. Price 50 cents. New York: D. Van Nostrand Company, Nos. 23 Murray and 27 Warren Sts. 1902.

tracks by the help of scores of powerful jacks. It would require immense power to push along even a 50-ton boulder resting on the ground, and be yet more difficult to move a long, thin, high wall several feet transversely without cracking, tipping or twisting it. Generally, when such a wall is to be relocated, it is taken down and rebuilt; but such was not the case on the subway above 135th Street, where, at the entrance to a tunnel-section, walls nearly 200 feet long retain the bank on each side of the cut. After the structure was completed it was decided to widen it 11 feet to receive a third track, and although it was at first intended to tear down the masonry and build new, it was finally decided to move it bodily, and this was successfully accomplished at a saving of several thousand dollars. The walls are of concrete and brick, 13 feet high at one end, 3 feet thick on top, and weigh about 400,000 pounds each. The earth was dug away behind them for a width of 6 feet, and to a depth a little below their foundations. In the bottom of each trench a concrete floor was laid just below the level of the foot of the wall. Small holes were tunnelled under the wall a few feet apart, and in them were laid transverse timbers reaching to the floor of the trench and having both ends supported on cross-sills. Narrow, thin, greased steel track-plates were inserted under the walls, on top of the timbers, and extended across the trench floors. Small steel bearing-plates were set on the track-plates under the front and rear edges of the walls, and pairs of oak wedges, driven between the cross-timbers and their sills, lifted the whole wall on the steel-plates. Horizontal 5-ton jack-screws were set close together against the face of the wall at the base for its whole length, and being simultaneously operated, the wall in a few hours was moved back 5½ feet on the floor in the trench. The projecting ends of the track-plates were cut off, and the spaces between the plates under the wall were filled with liquid cement. The work on each wall was done by twenty men in ten days, and the walls were not distorted the sixteenth of an inch."

Statues of Bruand and Hardouin-Mansart. — Among the projects under the consideration of the Paris Municipal Council is one for the erection of two statues in the Square de Breteuil, the subjects being Liberal Bruand and Jules Hardouin-Mansart. Bruand's name is seldom mentioned, although he prepared the original design for the Invalides. Mansart's name is, on the contrary, familiar to Frenchmen, and it is surprising that an artist who is so identified with the national architecture should still be without a statue in Paris. One reason may arise from the difficulty of distinguishing between the various members of the family. Nicholas from an early age was entrusted with great buildings in Paris. One of them was the mansion now used for the Bank of France. He began the great church of Val de Grâce, but the upper part, including the dome, is the work of Le Mercier. Hardouin-Mansart, who was the pupil of Bruand, was for about thirty years engaged on the works at Versailles. He completed the Invalides with the exception of the dome, which he designed and partly carried out. There was another member of the family, who was engaged on the church of St. Eustache. We presume there can be no objection to statues of the two artists. It is true they were both Royalists, but it would be unfair to make them responsible for the shortcomings of the age in which they lived. — *The Architect.*

Gift to the Irish National Gallery. — The Countess of Milltown has made a most generous gift to the nation, which will be highly appreciated by the Irish people among whom she has lived so long. She has made over by deed to the National Gallery in Dublin all the splendid pictures, plate, furniture, and other objects of value in her residence, Russborough, Blessington (County Wicklow), and directs them to be kept in separate rooms, and marked as the Milltown Museum. Thus, the Irish National Gallery will have the unique advantage of showing the whole furniture of a stately country house, built and adorned in the best period — towards the end of the eighteenth century. The donor of this interesting and remarkable gift is a daughter of the fifth Earl of Harrington, and married in 1871 the sixth Earl of Milltown, who died in 1890. He left no children, and the peerage went to his brother, who only held it for a year, when he also expired without heirs, and the title became extinct. There are, however, two claimants to it, descendants of sons of the third Earl, but neither of them has, as yet, established his right, and the title no longer appears on the Ulster roll. — *London Telegraph.*

Acoustic Changes at the Prince Regent's Theatre, Munich. — Few opera-houses in any country are acoustically satisfactory. In the past there was a belief that it was all a matter of luck, and that, if the architect did not accidentally stumble onto the right thing, the public would have to submit to its fate, with Oriental resignation. We know better now. The changes made in the new Prince Regent's Theatre in Munich last year show how much can be done to mend matters. Otto Lessmann describes these changes in the *Allgemeine Musik Zeitung* for August 29, and attests that "the orchestral sound has gained much in softness and refinement, without any loss of brilliancy. The individual parts of the body instrumental can now be distinguished, even in the most complex polyphony, with surprising clearness. The brasses, which last year were hard and blaring, now have a soft metallic clang, while the mighty body of strings gives forth sounds which are ideally beautiful in *forte* as well as in *piano*. In a word, the improvement of the acoustics is astounding, and I believe that from the tonal point-of-view the Munich festival theatre now equals that of Bayreuth." — *N. Y. Evening Post.*

An Exhibition of Paris Shop-signs. — For some months past the idea of an exhibition of shop-signs has been fructifying in the mind of M. Detaille, the well-known painter of battle-scenes. Now the project has taken definite shape, and has for godfather the Prefect of the Seine, M. Selves. Notices have been issued giving particulars of the exhibition, which is to take place in October next. The wish of M. Detaille and his brother-artists associated with him on the committee is to revive the old signs that were such a picturesque feature of Paris of fifty years ago. Here and there one meets portions of the old streets incorporated in the new boulevards, quaint old houses with their old signs still attaching to the little narrow shop-fronts. There are, indeed, some interesting trade-symbols in various parts of the city, some but newly installed. In the Rue Bonaparte, for instance, a tradesman has recently raised a sign above his premises, which bears the figure of Napoleon mounted upon his white horse. Oddly enough, the name of the tradesman is Lempereur. The sweep and the barber have very largely conserved their ancient distinctions, and, indeed, there is a very common tendency in the ornamentation of the building to call attention to the wares of the tenant. The florists, however, who show such exquisite taste in the arrangement of their windows, have, as a trade, adopted a sign which is as lugubrious and unpleasant as can well be imagined — a composition funeral wreath. It is needless to say that the committee will not encourage designs of that sort; rather we may expect to see a revival of the arts of the cunning smith who with his own strong hands forges a graceful bracket for a swinging board. It has been pointed out that the painted sign is a remnant of the age when the public as a mass, unable to read, possessed this sole means of identification of a particular establishment. In that sense, the sign has ceased to be necessary. Nevertheless, the artistic sign will add to the amenities of the pleasant streets of Paris, even if there is no direct furtherance of trade. — *Pall-Mall Gazette.*

Japanese Investigation of Buddhist Remains. — A remarkable illustration of Japanese enterprise and advancement is an archæological expedition which has just left for Central Asia under the management of Count Otani Kozui and M. Watanabe Tetsushin, both Members of the Japan Society. Count Otani is also a Member of the Royal Geographical Society of London. The purpose of the expedition is to search for the Buddhistic remains in Central Asia, India, and China, and to trace as far as is possible the course of Buddhism from its source northwards and eastwards to Japan. The members of the party, seven in number, are all Japanese. Count Otani's father, Otani Kozon, now living in Kioto, is Lord Abbott of Nishi Hon-gwan-ji, the monastery of the "Original Vow," and a direct descendant of Shinran, the richest founder of the Shin Shin sect, who lived in the eleventh century. Count Otani Kozui has been an extensive traveller, and was elected a Member of the Royal Geographical Society because of his explorations in China. His father sent him to Jerusalem to study Christianity and Mohammedanism, and on his own initiative he visited Iceland and spent the best part of a year in the Arctic Circle. He is an enthusiastic student of Sanskrit and ancient Chinese, and has done much original work in the Oriental room of the British Museum. All the members of the expedition have been preparing for this work for several years. M. Watanabe Tetsushin has been studying church history with a priest of the Church of England, and has paid particular attention to the Nestorians, who wandered from Constantinople off into Asia in the fifth century. He lived in St. Petersburg one year and speaks Russian fluently. M. Hori Masuo, who will look after the surveys and the map-making, has been studying topography in Oxford. M. Inongo Koen, a veteran of the Chino-Japanese war, will have charge of the transport; M. Fujii Sensho, Ph. D., is well versed in Chinese and Japanese Buddhistic literature. He has been studying Sanskrit in Berlin and Paris, and has already been several times in India. — *N. Y. Evening Post.*

Coal Briquettes in Germany. — The manufacture and use of briquettes in Germany, an article of fuel composed of brown coal, peat and the dust and waste from coal-mines, has developed to such important proportions in recent years as to attract wide attention, especially at this time. The following tabulated statement shows the amount and the prices for a period of eleven years: —

	Production (Tons).	Sales of Syndicate (Tons).	Price Per Ton.
1891	482,495	202,780	$3.02
1892	533,075	516,508	2.49
1893	694,025	645,144	2.16
1894	745,414	719,258	2.10
1895	796,363	780,185	2.16
1896	830,985	818,300	2.22
1897	943,732	934,221	2.38
1898	1,078,113	1,245,269	2.43
1899	1,530,816	1,485,130	2.34
1890	1,563,928	1,519,811	2.92
1901	1,566,385	1,560,230	3.17

This kind of briquette forms the principal domestic fuel in Berlin and other cities in Germany, and is used also in locomotives and manufacturing industries. It is clean and convenient to handle, lights quickly and burns with a clear, intense flame, and the combustion is practically smokeless. Hence, Berlin, though a busy manufacturing city, is one of the cleanest cities in Europe, so far as smoke is concerned. Like most other important German industries, this is controlled by a syndicate which includes thirty-one firms and companies, or more than nine-tenths of all the producers in the country, and which regulates the output and prices. Yet the prices remain comparatively low and are commensurate with the means of the poorer classes. Of the 1,566,385 tons sold by the syndicate last year, 749,208 tons were taken by the German railways, 124,380 tons were sold to retailers, 497,136 tons were sold to factories and works of various kinds, and 149,089 tons, or 9.8 per cent, were used by German merchant-steamers and the navy or exported to the German colonies or neighboring European countries. — *Boston Transcript.*

Shakespeare Statue at Elsinore. — A committee has been formed to erect a statue of William Shakespeare in the open space opposite the so-called "Hamlet Terrace" of Kronborg Castle, at Elsinore, Denmark. — *Exchange.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, OCTOBER 11, 1902 No. 1398

CONTENTS

SUMMARY: —
The President and the Coal Strike. — One of the Weak Points in Trust Managements. — Death of James Hobrecht, Engineer. — The Size-limit for Lathe-turned Monolithic Columns. — Contributions for the Rebuilding of the Tower of St. Mark. — The Possibilities of Longevity in American Buildings. — The "Collective," or Family, Ticket on a French Railway. 9
RELATIVE PERMANENCE OF STEEL AND MASONRY CONSTRUCTION. — I. 11
ROMAN AND ROMANESQUE FRANCE. — III. 13
BOOKS AND PAPERS. 15
ILLUSTRATIONS: —
The Portico: Deborah Cook Sayles Public Library, Pawtucket, R. I. — Alterations in the Mayor's Office, City-hall, New York, N. Y.: Two Plates. — The Ward-Mackey Co. Bakery Building, Pittsburgh, Pa. — "Originality," and l'Art Nouveau: House on the Avenue Rapp, Paris, France.
Louisiana Purchase Exposition, St. Louis, Mo.: The Textiles, Manufactures and Administration Buildings.
Additional: The Deborah Cook Sayles Public Library, Pawtucket, R. I. — The First Baptist Church, Watertown, Mass.: The Cloister; — The Auditorium. — The Chapel and Auditorium in the same Church. — A Competitive Design for the Carnegie Library, Burlington, Vt. — St. Stephen's Catholic Church, Warwick, N. Y. — Detail of Order: St. John's Chapel, Varick St., New York, N. Y. — Pulpit and Organ in the same Chapel. 15
COMMUNICATIONS: —
An Old Building-contract. — The New York Art Commission and the Street-signs. 15
NOTES AND CLIPPINGS. 16

IT must be confessed that the results of the interview between the President, Mr. Mitchell and the coal operators do not cast much credit upon the intelligence of the operators. It was presumed by the public, and, probably, by Mr. Roosevelt, that the operators, after hearing what Mr. Mitchell had to say, would present a reply to his proposals. Instead of this, there is, practically, no evidence that they even listened to what he said, much less gave it any rational consideration. If, instead of composing rambling denunciations of anarchy in general, and extolling their own virtue in standing up for the principle of freedom of labor, they had attended to Mr. Mitchell's words, they would have seen that he was making them and the country a straightforward and unequivocal offer of everything that they represent themselves as contending for, in his proposition to leave all the points at issue to the President, or to commissioners appointed by him, the award to be binding on all parties. The operators say that they are fighting for the right of non-union men to work in the mines without molestation. It is inconceivable that the President, or any commissioners appointed by him, would deny that right, so that an acceptance of Mr. Mitchell's offer would at once have accomplished the object for which, as the operators say, they are sacrificing themselves and other people. The only other points, apparently, which would come before the commissioners would be those relating to wages and "improved environment," and it is safe to say that neither President Roosevelt nor any commissioners of his choosing would be unreasonable in regard to them. The lying, in regard to these matters, is at present something frightful, the miners declaring that they are compelled to live in abject misery, on incomes of forty or fifty dollars a month, while the operators affirm that the average miner earns about three dollars and a half in five hours of every day, and invests his surplus income in real-estate and savings-bank deposits; but any commission with common-sense would soon ascertain the facts, and if it found that undeserved misery really existed, and could be cured by a reasonable increase of wages, the whole American people would approve an award providing for such increase.

THE trouble about coming to an agreement seems to have been that the operators present at the meeting were so blinded by their private prejudices that they could not even see their own interest, much less that of their men and the public. The idea of combining all the anthracite miners into one organization, which appears to the public quite as legitimate as a combination of the operators, seemed to work on their feelings as the shaking of a red rag does on those of a bull; while their grief and despair on account of the violent acts committed by the striking miners, which Mr. Mitchell probably deprecates as much as they do, prevented them, apparently, from listening to a proposition which would immediately put a stop to such violent acts, without endangering any of the objects which they profess to cherish. If we imagine Grant, at Appomattox, driving off the messengers who brought him Lee's flag of truce on the ground that his "principles" would not allow him to have anything to do with a representative of secession, or to enter into any negotiations so long as "violence" continued in the South; and that, rather than accept the sword of such an odious person, he would continue fighting until the last man on both sides had fallen, we shall have a good illustration of the attitude which the operators seem to have thought fit to assume before the President and the public. It is not difficult to imagine what military fate would await a general who carried on negotiations in this spirit; and it is possible that the stockholders of the coal roads, which are now not earning their operating expenses, may solve the great problem by putting in charge of their property men who can comprehend an opportunity when it is offered them.

IT is one of the weaknesses of trusts, a weakness which has already proved fatal to some, and is likely to bring about the ruin, or, at least, the dissolution, of many others, that they almost completely eliminate the personal initiative, and the quick decision in taking advantage of favorable circumstances, on which business success depends. A single operator, trained to foresee the consequences of every movement affecting his business, responsible only to himself, and enjoying full authority to decide all questions as he may see fit, without explaining his reasons to anybody, would, if of ordinary intelligence, have closed with Mr. Mitchell's proposition on the spot; but with a number of officials, of equal authority, and bound by agreement to act together, the sense of responsibility in each is so slight, and the difficulty of getting them all to comprehend any proposed action is so great, that anything like a rapid act of intelligence is not to be expected from them; and, unless they act simply as unquestioning instruments in the hand of some one person of preëminent ability, which very rarely happens, they soon fall into the habit of dull obstructiveness which is so marked a characteristic of trust administration, and which was so strikingly displayed at the Roosevelt interview. Ultimately, this sort of management generally comes to grief, in business matters, before the competition of individual alertness and decision; but neither the public nor the stockholders in the coal roads can wait until circumstances have taught their officials to reply to an advantageous business proposition by something else than discourses on their services in the Civil War, and the sooner the people who own the property which is being sacrificed take the control of it, the better it will be for everybody.

THE engineering world, which, in Germany, includes the architectural world, laments the death of James Hobrecht, one of the most famous of modern engineers, and the author of the Berlin sewerage system, in many respects the best ever devised for a great city. More than forty years ago, the municipal government of Berlin sent an engineer Commissioner to England and France, to study the most improved drainage systems of inland cities, with a view to their application to the needs of Berlin, and with this Commissioner was sent James Hobrecht, then a young architect, as assistant. Hobrecht was a skilful draughtsman, and his sketches served, after the return of the party, to illustrate the report of the Commissioner on the "Drainage of Berlin." The Commissioner, Wiebe, was, as a result of his investigations, charged with the preparation of a plan for the sewerage of the city; and, according to the practice then in vogue, he drew up a scheme by which the little river Spree was made to receive all the drainage of what, even then, was a city of five hundred and fifty thousand inhabitants. Hobrecht, more far-seeing, appreciated the difficulties which would result from loading a little fresh-water stream, far from the sea, with the sewage of a great and growing city, and made up his mind that the only successful method of disposal must be sought in some form of irrigation, for which the flat, sandy plain surrounding the city afforded certain advantages.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

Although Milan and Edinburgh had practised sewage irrigation on a small scale for some years, no great city had yet attempted it; and all Hobrecht's enthusiasm and force of character were required to persuade the Berlin authorities of its practicability. The plan of Wiebe, for pouring a flood of sewage into the Spree, was, however, set aside in the meanwhile, and it was finally decided to adopt, in general, the project that Hobrecht advocated. Fortunately, this project was a comprehensive one, and, although Berlin has now nearly two million inhabitants, and certain details of the system have been modified in extending it, the irrigation-fields still dispose of the drainage satisfactorily. At this time, when nearly every great city in Europe has adopted the irrigation system, it is hard to realize the difficulties under which the young German architect labored in bringing the municipal authorities, as well as the people of the city, to the comprehension and appreciation of his views. Fortunately, he was endowed by nature with great courage and perseverance, and he enjoyed, in addition, that confidence and support of his fellow engineers and architects which is so precious to the professional man, and which the German architects and engineers bestow upon each other so generously and intelligently. The architects, in particular, who always considered him as one of themselves, although his work was rather engineering than architectural, made him a Director of the Berlin Architectural Society, and, for many years, enjoyed his counsel and sympathy as much, no doubt, as he did theirs. After his great work at Berlin was complete, he was immediately called to carry out similar undertakings elsewhere, and Moscow, Tokio, Cairo and Alexandria, besides Stettin and Darmstadt, owe to him their drainage systems.

ARCHITECTS will be interested to learn the limit of size to which it is practicable to turn and polish granite columns in this country. In the new Episcopal Cathedral in New York, provision is made for eight columns, the shafts of which, of polished granite, are fifty-four feet long, and six feet in diameter. There seems to be no difficulty in getting these shafts as monoliths out of the quarry; but, in order to polish them, they must be put in a lathe, and, after several years' trial, the contractor, Mr. John Pierce, has come to the conclusion that it is impracticable, with any machinery now in use, to support the columns in such a way that they will not break, from their own weight, while being turned. The turning itself presents no great difficulty, as lathes capable of turning a cannon sixty feet long have been for many years in use; but a cannon needs little or no support in the middle while being turned, whereas a granite cylinder, nine diameters long, supported only at the ends, cannot be depended upon to sustain its own weight. If it were possible to rest the middle portion on a support of some kind, the strain would be greatly diminished, but, in the nature of things, it is impracticable to give a stone, which is comparatively rough when put into the lathe, a firm support of this sort. The Trustees of the Cathedral, on being informed of the circumstances, have authorized the making of these shafts in two pieces, one thirty-six feet long, and the other eighteen. Only three of the columns are as yet ordered, the intention being to erect them by subscription, as memorials of distinguished persons. They cost about sixteen thousand dollars each, so that they do not form a very expensive monument, and it would be difficult to devise a more effective one for the money.

THE National Arts Club, of New York, repeats its invitation to all persons interested to join in its contribution toward the rebuilding of the Venetian Campanile. About six hundred dollars was subscribed among members of the Club immediately after the catastrophe, and, as the Syndic of Venice, Count Grimani, has assured the Club that its contribution will be received with "the heartfelt thanks" of the city of Venice for its interest and sympathy, the Committee of the Club feels justified in again inviting all Americans who would like to be associated with the gift to send contributions, of any size, to its Treasurer, Mr. Spencer Trask, 27 Pine Street, New York.

THE timber lands of the Northwest, which, a few years ago, were supposed to be practically inexhaustible, have fallen mostly into the hands of syndicates of speculators, who, as they now control the supply of lumber, have raised prices very materially; and the people of the Pacific Coast will have to pay the advance. Undoubtedly, in California and Oregon, as in Minnesota, Iowa and other Western States, the result of the increase in prices will be to excite a popular demand for the repeal of the duties on lumber; but, even with Canadian lumber admitted free, the cost of timber building is likely to rise, with occasional fluctuations, until construction with more substantial materials becomes the rule here, even in country districts, as it is everywhere in Europe except in the forest districts. That the art of architecture will gain by the change there can hardly be any question. Our wooden houses are well planned, convenient, neat, and occasionally picturesque, but they rarely have anything of real fine-art about them, and age and decay, instead of making them more beautiful, as is often the case with stone buildings, and sometimes with those of brick and terra-cotta, give them a peculiarly repulsive meanness. It is curious that, with all our boasted science, our facilities for transportation, and our unrivalled cements, it seems to be impossible for us to approach the perfection of construction of, let us say, the fourteenth or fifteenth century. Most architects are familiar with the Hôtel Cluny, in Paris, whose perfection of material and workmanship, after exposure to the elements for four hundred years, puts to shame the cracked and dislocated masonry, the leaning and crooked walls, and the open joints, of almost all our most costly buildings. The experienced eye of the architect shows him, as he passes through our city streets, that very few of the structures that he sees there will reach their one-hundredth birthday, without practical rebuilding, much less their four-hundredth.

IT is common to excuse these imperfections of modern construction by saying that modern requirements demand a haste in building which is incompatible with solidity, and that, as American cities are, practically, rebuilt at least once in fifty years, it is not necessary to spend time and money in assuring the indefinite duration of a structure which, in half a century, at most, will be removed as an obsolete and valueless incumbrance to the ground. There is, of course, much truth in this, but the artist, if not the economist, finds difficulty in reconciling himself to the idea that his work will, perhaps within his own lifetime, be torn down, and consigned to the dump-heap, to make room for that of some more "up-to-date" person; and it is not impossible that we may find, as artistic feeling grows more general in this country, the best work devoted to comparatively unpretending structures.

THE Paris, Lyons and Mediterranean Railway has put in effect this summer a system of reduced-rate tickets which deserves imitation here. As this road connects Paris not only with the Mediterranean, but with Geneva and the mountain regions of Switzerland, it offers great attractions for people who wish to take their families to some pleasant seaside or mountain resort for the summer; and the railway company has undertaken to encourage the Parisians to give their families this pleasure by offering family tickets, available from the fifteenth of July to the first of November, between Paris and any station on the Paris, Lyons and Mediterranean system, at a reduced rate. The rate, for a family of three, going and returning, is equivalent to the price of five single tickets; that is, two of the family pay full fare both ways, while the third pays half fare. For a family of four or more, the price is again reduced, each person beyond the third paying one-half of the regular fare one way, or one-quarter of the full rate; so that a family of nine persons, for example, pays only four full fares. The well-to-do French are so fond of family trips that an arrangement of this kind is likely to be very popular; and the railway company adds to its attractions by providing that any one or more of the persons included in a "collective ticket" of this kind, on presenting a certificate which is furnished, on request, with the ticket, shall be entitled to travel between Paris and the destination named in the collective ticket, at any time while it remains in force, for one-half the regular fare; the object of this being, of course, to permit fathers of families, uncles or elder brothers, to attend to their affairs in Paris, or to make business visits, without too great expense. To make sure that these family tickets are used for the intended purpose, they are issued only between Paris and stations at a distance of two hundred miles or more; but, in order that prudent fathers of families may economize in their own travelling, without obliging their wives and children to journey uncomfortably, a person who takes a first-class "collective ticket" for his family may, after he has installed them comfortably in their seashore or mountain hotel, travel back and forth alone at half second-class fare.

RELATIVE PERMANENCE OF STEEL AND MASONRY CONSTRUCTION.[1] — I.

FORMAL papers, prepared with deliberation for delivery before an audience, or for publication in a periodical, are very excellent and desirable means for imparting information, but it is questionable whether, for the giving of information in an impressive and memorable form, they equal the more accidental method of *viva voce* discussion.

It is this belief that leads us to quote at length the discussion that our fellow-professionals the members of the American Society of Civil Engineers recently held on the ever-interesting topic of the lasting qualities of modern methods of construction.

CHARLES G. DARRACH, M. Am. Soc. C. E. — The speaker approaches this subject with some trepidation, as it is worthy of higher talent than he possesses.

To deal with the subject properly, there should be not only discussion, but contention and consultation, so that it may not be recorded among the dead by the epitaph which heads our publications: "This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications."

The speaker would suggest that the subject be amended so as to read, "Is Metallic Construction, or the Combination of Metal and Cement Concrete, susceptible of being made as Permanent a Building Material as Masonry?"

Many years ago, the late Julius W. Adams, then President of the Society, suggested to the speaker that it was preëminently the business of the engineer to adapt the *motif* of his construction to the genius of the locality in which his field of operations lay. This is, in fact, the chief business of the engineer, and is using the best and cheapest means for the end to be attained.

It must not be forgotten, however, in making comparisons, that the best materials may be manipulated so as to produce inferior results, and the proper use of materials in composite engineering construction is as absolutely necessary as in the domestic arts, which please our palates, for it is well known that the cook can either spoil the pie or make the pudding.

Before determining upon a method of construction, there should be considered, not only the first cost, but also the expense of maintenance. The ease of inspection during erection should also be considered, as well as the adaptability of the material to obtain the most economical results.

A knowledge of the relative strength of the various materials, and also of the causes for deterioration and decay, should be attained. With this knowledge the problems will reduce themselves to some degree of simplicity. This knowledge can then be supplemented by observation and experiment, so that there need be no reason to fear results. Knowing the disease, the remedy therefor can be obtained.

The idea that masonry is the *sine qua non* of all permanent construction seems to the speaker to be without foundation. Permanence of masonry construction depends, not only upon proper design, but also upon perfect workmanship. All who have had any experience in construction know well that the most trying and difficult task of the engineer is to have masonry properly erected. In masonry construction, dependence must be placed upon the physical value of the stone, sand and cement. The stone, being a natural product, may or may not have that degree of permanence expected by the engineer, and, to meet this contingency, a large factor of safety is generally introduced in the calculations for masonry construction. Also, in many cases, where masonry is used, it is impossible to design the structure so that the economical quantities of material to meet necessary requirements can be used.

As has been intimated, masonry, as well as metallic construction, may be subject to deterioration and decay.

In using metallic construction, it is possible to calculate the stress upon the structure with a far greater degree of accuracy than can be applied to a masonry structure; consequently, the factor of ignorance can be reduced and the quantity of material used be nearer to that which is theoretically required. Inspection during construction and erection, and after completion, is more convenient, and, knowing the causes for deterioration, the necessary remedies and protection may be readily applied.

The use of concrete, or artificial stone, appeals to the speaker with much force. By its use artificial stone of equal value throughout the entire content can be obtained, and that value can be determined in direct accordance with the material of which it is made; so that the composition of the artificial stone can be adapted directly to the use for which it is intended. The cost of construction for equal values in artificial stone is generally much less than if natural stone were used.

Artificial stone, or concrete, forms a protection against the usual deterioration of metallic construction by atmospheric influence.

The logical conclusion seems to be that the best method of construction would be composite, using artificial stone and metal. Artificial stone, or concrete, not only forms a protection for the metal, but adds its value in resisting stress, and, except in subterranean and subaqueous structures the deterioration of metal encased in cement-concrete of proper composition may be disregarded.

There are many examples of structural metallic work encased in concrete where no deterioration is shown, even from ancient times. The modern system of iron construction encased in concrete or brick masonry, used in high office-buildings, shows that, when properly constructed, there is no observable deterioration in the metallic work. The Drexel Building, Fifth and Chestnut Streets, Philadelphia, was constructed in the years 1886–87. The speaker has removed portions of the ironwork in that building, and could see no deterioration whatever.

In the year 1891, the speaker made a cement floor and walk over a pipe-tunnel, the upper surface of which was exposed to all atmospheric influences. This floor was of cement concrete, about 4 inches in thickness, and had a span of about 5 feet. It was reënforced by bands of ordinary chicken-wire fencing, 16 inches in width, laid across the tunnel and spaced 16 inches apart. A bed of mortar, composed of cement and sand, about 1 inch thick, was laid upon a horizontal plank centre, and brought up flush with the top of the side-walls of the tunnel. Over this mortar the chicken-wire was laid, extending over the side-walls. The cement-concrete floor, 3 inches in depth, was laid upon this chicken-wire, and finished, the walk being about 7 feet wide. Although this walk has been in use for eleven years, no deterioration is apparent, nor has there ever been any leakage, even during the most severe storms.

In relation to this, attention is called to what the speaker considers faulty construction. The concrete floors of most office-buildings are of cement and ashes or cinders. The resultant concrete is not impervious. The large quantity of water used in construction is retained within the exterior skins of these floors for a long period, and, no doubt, is a detriment to the metallic construction of the floors.

In the year 1884, the speaker constructed a water-works well at Redbank, N. J. This well was some 15 feet in interior diameter, and was sunk from the surface of the ground to a depth of about 60 feet. The lower half, or 30 feet, was below the ocean level, and the entire well, to within 5 feet of the surface of the ground, was under the ground-water level. The water arose in the well to within 8 feet of the surface of the ground, so that the well-casing, 20 inches in thickness, constructed of hard brick laid in Portland-cement mortar, was continually in contact with water on both sides, and at times, even during construction, was under a pressure from the outside of more than 40 feet.

For reënforcing the brick shell during sinking, ¾-inch iron rods were extended from the cutting-curb upward through the masonry; and, at intervals of about 6 feet, large wrought-iron washers were placed over the rods and extended around the entire circumference of the well-casing. This construction was adopted to reënforce the green masonry of the casing during the operation of sinking. It would be interesting to examine this ironwork for the purposes of discussing this subject.

In the speaker's opinion, the hue and cry raised in relation to a properly constructed iron skeleton, in modern high buildings, is without foundation.

In buildings where the ironwork is concealed within fireproofing or concrete, there is little reason to suppose that any deterioration takes place, and the speaker will venture to state that, if the temperature and the humidity of the atmosphere immediately adjacent to the metallic structural work were observed and recorded, there would be found but little, if any, difference throughout the year.

Greater care, and concrete richer in cement, should be used for subterranean and subaqueous composite construction, and, in some cases, it would be advisable to use an asphaltic concrete, so as to absolutely prevent the possibility of any moisture coming in contact with the metal.

The numerous cases of electrolysis in subterranean metallic pipes suggest a criticism which has not as yet been presented to the speaker. Is it not possible that, in subterranean and subaqueous work, metal, even when constructed in cement concrete, may be subject to electrolysis similar to that experienced in metallic water and gas pipes? The speaker is of the opinion that all such subaqueous and subterranean constructions should be laid, as heretofore indicated, in an asphaltic concrete, and efforts should be made to force our legislators to pass laws preventing the use of the ground for an omnibus commercial electrical conductor.

We can also substitute for cast and wrought iron pipes a cheaper and more permanent conduit, constructed under the composite system. The capacity of metallic water-pipes is materially diminished by the formation of nodules on their interior surfaces, and, with some waters, the life of iron pipes is merely a question of a very few years.

Composite pipes, constructed of concrete reënforced by metal, can be constructed so as to have the necessary strength without the loss of conductivity due to the metal nodules, and it is not necessary that the concrete of which they are composed should be of such richness as to absolutely prevent at first the transmission of moisture, except when the liquid conducted is free from suspended matter. Conduits carrying either turbid water or sewage soon fill up the pores in the concrete, and make it impervious.

In 1894, the speaker constructed a septic tank for the Insane Asylum at Wernersville, Pa. The diameter of the tank was 25 feet, and the depth of water was 14 feet. The well was constructed of hard brick, laid in Portland-cement mortar, and had a maximum thickness of 21 inches. There was an inside coating of plaster, ½-inch thick, made of equal parts of Portland-cement and sharp sand. Tests were made through a period of ten weeks, at the end of which time masonry was practically impervious.

[1] An Informal Discussion at the Annual Convention, May 21, 1902, of the American Society of Civil Engineers and printed in the Society's *Proceedings* for August, 1902.

There is a paucity of experimental knowledge as to the strength of composite construction; the field is wide, of great importance, and deserves the attention and study of the members of our profession.

Before closing, the speaker would suggest that further experiment be instituted as to the possibility of making a metallic weld, to avoid as much as possible the use of bolts and rivets. He is aware that the electric weld does not give a resultant value of 100 per cent, but he is of the opinion that the Society would be gratified with a knowledge of the best results so far obtained.

EUGENE W. STERN, M. Am. Soc. C. E. — Discussing this question from the standpoint of the protection of iron-and-steel construction in buildings, the experience of the speaker is that iron does rust in buildings. That is, it rusts unless properly protected. Therefore, it is a very important question to determine what kind of protection it needs to prevent this, under different conditions of exposure.

In the interior of buildings, where there is no chance of moisture or acids attacking the iron, and where it is usually surrounded by fireproofing materials, the danger from rust is very slight. The usual coat of paint appears to give all the protection necessary.

The speaker has seen ironwork taken from the interior of buildings, in one case after thirty years, in which the shop-marks of white paint and the brown coat of red-oxide paint were in as perfect condition as if done but recently.

In the exterior walls of a building, however, and in the roof and cellar construction, it is an entirely different matter. A driving rain will go through the outer coating of brickwork; roofs will somehow or other leak, and cellars rarely are absolutely dry. The speaker has invariably seen evidences of rust on the ironwork taken from the above-mentioned positions in comparatively recent buildings. The paint seemed to have disappeared entirely in many cases where exterior brickwork was laid up against the iron. Where the mortar was in immediate contact with the iron, there was no rust; where the brick was directly in contact, there was considerable rust.

In a building in New York City, built in 1869, and now being taken down, cast-iron girders supporting the brick arches of the sidewalk construction were rusted about $\frac{1}{2}$ inch where the brick was immediately in contact with the iron, but where the mortar was directly in contact the iron was perfectly clean and black, looking as if taken from the sand only yesterday. The evidence that paint protects ironwork thus exposed, for any length of time, is not forthcoming. The paint seems to disappear entirely in a few years. Nor, in the speaker's opinion, does it help matters to prepare the surface of the ironwork, prior to painting, in the most painstaking and thorough manner, even using the sand-blast to remove the mill scale. Some of the paint is rubbed off the ironwork during erection, notwithstanding that the very greatest care is used. It is an inseparable condition, from the nature of the work, that this happens. There is then a starting-point for rust, and this will follow more quickly on a sand-blasted surface than on one having its mill scale.

The speaker is strongly opposed to the use of the sand-blast on ironwork for buildings. It does not help to protect iron permanently, and the expense, therefore, is not justified. For this reason the following method of protection is recommended: All the columns and girders in the exterior walls, the roof, the cellar, and wherever exposed to moisture or acids, should be surrounded with Portland-cement mortar, and the bore of the columns in such locations should also be filled solid with this mortar.

Broken stone in the mixture is not recommended, because the voids may not always be filled; and cinders are strongly objected to because there is good evidence to show their very harmful effect.

A building having its frame thus protected should remain structurally sound, judging from evidence, for many years, perhaps longer than one made entirely of masonry, unless of the best quality.

GEORGE F. SWAIN, M. Am. Soc. C. E. — People in general have come to consider iron or steel as rather perishable materials when compared with stone. Many persons form this idea by considering the old stone structures of the Greeks and Romans, notwithstanding the fact, referred to by one speaker, that there are a great many stone structures which have proved very perishable. Many instances can be cited of bridge-abutments built of sandstone or limestone which have practically gone to pieces within thirty or forty years. In judging of the ancient stone structures of Greece or Rome, we must also remember the difference in climate between those countries and Northern New England. It may not be out of place to point out also some differences between the ways in which steel and stone structures act. A stone structure is a comparatively simple one; it acts by its own weight; it acts generally in simple compression; its durability is a question of stability rather than of strength, and the loads may generally be increased greatly without endangering it.

A steel structure is very different. It is a complex structure, involving complicated stresses and strains; its strength is a controlling factor in its durability, and any increase of load reduces correspondingly its margin of safety. Engineers who have had much to do with questions of renewing bridges will agree with the speaker that cases in which bridges have had to be renewed on account of the actual wearing out of the material are comparatively rare. Of course, there are cases where corrosion is active, especially in bridges over railroads, but, leaving out such cases, the greater number of renewals which have taken place are due to other causes. One of these is defective design. Engineers are learning more and more every day in regard to the details of steel structures, and they are experimenting and studying the various connections and details. The result is that we find that structures built twenty or thirty years ago, and supposed to have an ample factor of safety, really had a much smaller factor. Moreover, as every one knows, the loads to which steel structures are exposed have increased enormously. These are the two elements which have caused the principal renewals of bridge structures. These elements will continue to be present, and, as long as they are present, we cannot hope to have steel structures in general as durable as the best stone structures would be. In the case of a steel-frame building, the loads, presumably, are not to change very much, and with good design the actual durability of the material should govern the life of the structure. As to what that durability will be seems very uncertain. All the engineer can do is to take every precaution he can to ensure the permanency of his steel. The speaker agrees with Mr. Stern that the steel should be completely enclosed in concrete, but, even under these conditions, he does not think the steel will last as long as the best masonry.

CHARLES C. WENTWORTH, M. Am. Soc. C. E. — The answer so far given to this question is that steel, when embedded in concrete to a sufficient depth, is permanent. A structure in which the steel is thus hidden becomes at times essentially as one built of concrete as of steel, and may be even more so. The fact that, in most cases, it is impracticable to adopt a composite construction, rather than one all steel or all concrete, renders it still necessary to seek a more complete answer to the question; especially if it be considered, as it must be, that bridges are made of "building material."

The answer given, for instance, is inapplicable to the East River bridges, built or building in New York City, and to the greater part, by weight, of ordinary railway-bridges. It is surely inapplicable to more structural steelwork, by weight, than it is applicable to all kinds.

The protection afforded by concrete is afforded by paint, but in a less degree. The objection to paint as an answer to the question lies in the fact that much structural work is inaccessible after erection, and that, in all likelihood, paint will not be applied properly or with sufficient frequency even where the work can be reached by the painter.

A more complete answer to the question appears to lie in the electro-plating of structural steel with copper or aluminium. This has already been done, to a small extent; but the subject does not appear to have received the attention it deserves.

The speaker sees no reason why such plating need be of excessive cost. Aluminium is an exceedingly abundant element, and is becoming cheaper; copper may retain its value. Metallic aluminium may not be needed in the process, but such aluminium salt as will serve when in solution as the source of the metallic aluminium finally composing the plating.

Of course it would be impracticable to plate steel as it comes from the rolls, as rivet-heads and sheared edges would need subsequent plating; but each structural piece, ready for shipment and erection in the structure, could be plated, and the details of field-connections arranged with a view to their permanency on the same lines.

The speaker does not wish to appear as objecting to the use of concrete structures stiffened by steel, with the incidental protection afforded to the steel by the concrete. Such structures are entirely proper and appropriate in very many cases; but, in conclusion, he wishes to say that the plating of structural steel, as a more general answer to the question, is well worthy of the attention of the members of this Society.

OBERLIN SMITH, M. Am. Soc. C. E. — The speaker is not experienced in putting up big steel buildings, but it seems to him that a certain precaution should be taken, which, perhaps, usually is not, and which will be mentioned later. Some of these buildings have been up a good many years and seem to be very strong, but after this generation is gone — fifty or one hundred years hence — if there is no way to examine all that hidden metal inside the masonry, how are people going to feel about the stability of such buildings? When will the time arrive for them to come down of themselves? There should be, therefore, some systematic method of examination.

Of course, after many years, the owners may tear out some of the masonry and examine the steel, but it would be a small matter now to provide inspection holes, properly covered, and to differentiate and classify the various conditions of possible deterioration to which the metal may be subjected.

Certain parts of the building which are most likely to rust, and where such rusting is most likely to cause accidents and damage, would be in one class, while other parts which are not so likely to be affected would be in another, and so forth. In every building, in several proper locations, let there be certain places left where the metal can very easily be exposed, and again covered up — of course in a fireproof manner. This would be done instead of merely tearing away a building at random, with perhaps considerable damage and with consequent expensive repairs.

To find out how the steel is really getting along, there should be certain times for observation, with definite intervals between. These intervals might be five, or ten, or twenty-five, years — as experience should dictate. The most risky "classes" should be examined the oftenest. In general, there should be certain definite methods of inspection, and definite places for inspection, and definite times for inspection of this buried and perhaps much-suffering metal, not only that such may be done with less damage to the building, but that it

may be done thinkingly and systematically — instead of waiting for some Chicago post-office to become obsolete that we may see whether it continued safe until the end. If not done in such a manner all may be neglected, and intervals which are uncertain may become of infinite length.

WILLIAM R. WEBSTER, M. Am. Soc. C. E. — The examination of many old bridges and other structures has shown that the white-lead marking-letters of the mill are intact, and that the metal is better protected at these places than at others. That is, the plates and shapes are generally marked while hot, and before the material has had a chance to rust; but the full importance of applying the protective coating while the metal is hot has not been appreciated.

The ordinary oiling at the mills has not been satisfactory, as the material is generally made sticky and difficult to handle in the shops. In relation to this, attention is called to a railroad spike dipped in oil, while slightly heated (in accordance with the specifications for an export order). Under this treatment the oil quickly dried and formed a good hard protective coating. This process might be applied to ordinary structural shapes and plates with great advantage; the material being cleaned with brushes and an air blast, and the oil applied while the material is still hot, the coating in no case being heavy enough to interfere with a thorough inspection for surface defects. The shop painting, of course, should be applied in the usual manner.

JAMES OWEN, M. Am. Soc. C. E. — It might be interesting to know that, in endeavoring to find some records of the strength of concrete beams, the speaker found, in the library of the Society, the report of some experiments made by Mr. Kirkaldy in 1854. Mr. Kirkaldy at that time had made an elaborate investigation of the strength of the admixture of concrete with iron rods and iron wire. Results showed at that time that the strength of the combination of the two materials, iron and concrete, was increased by more than two and one-half times that of the simple concrete itself. This is quite in accord with the present experiments in that line, and it is interesting to note that while these investigations were made so many years ago, it is only of late that the profession has appreciated their importance.

The speaker had a peculiar experience in relation to the strength of an ordinary bridge built with iron beams and brick arches and covered with concrete. The span was 15 feet. The bridge had been built some eight or ten years when the local engineer decided to change the grade of the street, and raised it about 6 feet. This alteration imposed on the bridge itself an extra load of 900 pounds per square foot. That, with a previous allowance of 200 pounds, made a total of 11,000 pounds. The bridge was originally designed for a live and dead load of 300 pounds and a factor of safety of four. A critical examination of the bridge, after the extra load had been on about six months, showed no rupture of any kind and no apparent deflection. The bridge is still in use.

It may be presumed, therefore, that the combined use of steel and concrete is susceptible of a great deal of further development, and that its ultimate strength is apparently unknown.

E. T. D. MYERS, JR., M. Am. Soc. C. E. — During the summer of 1901, a rifle-barrel was pumped up through the 20 inch pipe connected with the centrifrugal pump which was used in dredging out the historic dock immediately in front of Libby Prison. It arrived at the usual joint, just in front of the pump, which was intended to stop obstructions too large to pass through the pump. The pump was stopped and the rifle-barrel taken out. It was found that the blue enamel on the barrel was intact on at least 90 per cent of its surface, and the sight could be raised and lowered without the slightest difficulty. The date on the barrel was 1856. It was probably thrown in the water in 1865.

The water there is fresh, and is entirely free from lime. It is what is known as a "kind" water for boilers. The speaker does not know whether metal would last that way in other waters, but he has pumped up and dug up shells and rifles which were not rusted.

The depth of water in the dock was originally 16 feet, and the depth of the silt was about 4 feet. The pump was working at a depth of 22 feet. It is impossible to state the depth at which the rifle lay, but it probably came from the 16-foot level. The bottom is composed of sand and gravel, and the silt lying upon it came from the James River, which runs through a red-clay country. The rifle-barrel, therefore, had about 16 feet of mud and fresh water above it.

The speaker does not feel competent to discuss this topic, but he is deeply interested in it, and hopes that the result of the discussion will be the addition of much valuable information.

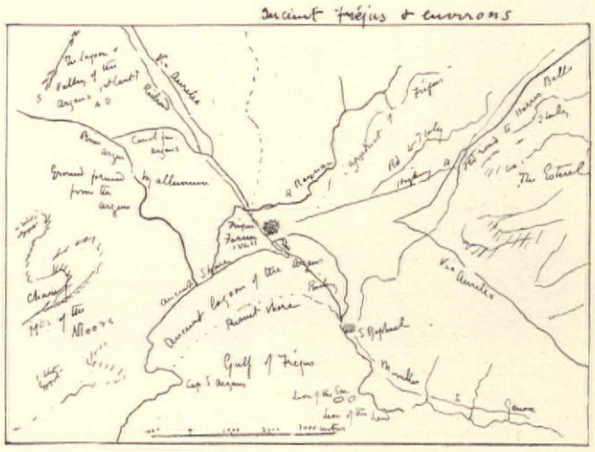
[To be continued.]

THE BALL-ROOM IN THE MELBOURNE GOVERNMENT HOUSE. — In the opinion of Mr. Shields, the new Australian Treasurer, Australians are nationally and individually an extravagant people. He proves it with an anecdote. When the present huge Government House in Melbourne was being planned, the architect consulted the Premier of the period as to the size of the ball-room. "Do you know anything about ball-rooms in other parts of the world?" queried the Premier. "I only know the one in Buckingham Palace," was the reply. "Then build our ball-room a third bigger than the one in Buckingham Palace." It was done as the lordly Premier commanded, and so Melbourne came to possess the biggest ball room in the world. — *N. Y. Tribune.*

ROMAN AND ROMANESQUE FRANCE.[1] — III.

FRÉJUS.

WHEN the Chancellor Michel de l'Hôpital (1505–73) was travelling in the South of France, he composed a letter to his friend Jacques du Four de Pibrac, in Latin verse, as was his wont, being a scholar devoted to elegant literature. "We come to Fréjus,"

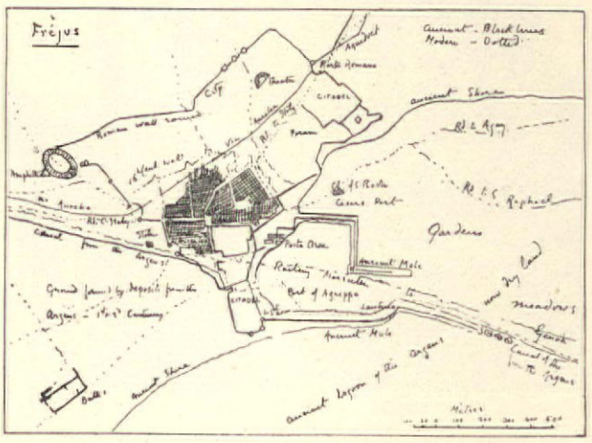


he says, "which is now only a poor small town. Here are the ruins of the old theatre, the broken arches, the baths, the aqueduct, and the scattered remains of the quay and basins; the port has disappeared beneath the sands, and in its place there are only the beach and the fields." Such as it was in the sixteenth century so it is now — dead of the mud and alluvium of the river to which it formerly owed its existence.

The earliest colonists were the Phœnicians and Phokean Greeks. Agricola, the father-in-law of Tacitus, calls it an illustrious and very old colony; Cæsar called it *Forum Julii Decumanorum*, and it became an important port on the Via Aurelia.

After the death of Cæsar, confusion reigned in the Empire. Antony was in the Alps, while Lepidus was governing Provence; hence, they were opposed to each other; and in a letter written by Marcus Lepidus to Cicero we get an idea of the state of affairs as Antony drew near to Fréjus: "I have learned," he wrote, "that Antony is advancing towards my province at the head of his army. . . . I have left the confluence of the Rhone, and have come by forced marches as far as Forum Vocanii [24 miles from Fréjus]; I have encamped my troops a little beyond it, near the river Argens." . . . Plaucus adds, saluting Cicero, "I have heard that Antony arrived at Fréjus with his vanguard about the ides of May." Later the two commanders met and formed a project for uniting their forces and sharing the spoil, the place of meeting being the bridge of Argens, the remains of which were standing only thirty years ago, when the three unequal arches were carried away by the sudden rise of the river, leaving only some portions of the abutments.

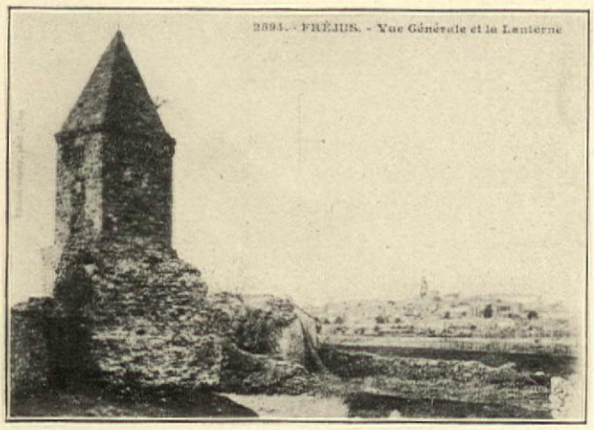
When the railway from Toulon to Nice was being constructed, excavations had to be made upon the alluvial land which was once the port of Fréjus; many inscribed stones were brought to light and *a few saved*, most of them being destroyed by the workmen. One, evidently a *cippus*, seems to have been a pedestal for a statue or vase. The beautiful letters of the inscription date it about the



second century B. C. The inscription is bilingual, the dedication being in Latin, the pathetic epitaph in Greek. "To Caius Vibius Ligur, his mother Maxima. This tomb was built for those who were older; but destiny has struck, under the influence of the climate of the country, a child seven years old. His relations, his father and

[1] Continued from No. 1394, page 86.

his mother, have buried him whom they had brought up. . . . Oh, the vain hopes of men here below." But the mass of ruins are of the period of Imperial Rome, subsequent to the conquest of Gaul, and it is sad to relate that the greatest destruction has taken place



General View of Frejus and the Lantern.

recently, as is proved by a description of them in the Abbé Girardin's "*Histoire de la ville et de l'église de Fréjus*," 1729. Even as late as the year 1829, the ruins were in a better condition than they are now (see "*Memoires sur la ville et le port de Fréjus*" by Ch. Texier, 1849); but the modern archæologist (and what architect is not an archæologist?) can still trace the extent of the Roman city and port.

The town had four gates: the Porta Gallica, Porta Romana, Porta Argentea and Porta Oræ, called incorrectly Aurea and Dorée in modern times. Built of regular courses of red sandstone, porphyry and brick, it is of later date than the rest of the town, and formed part of a large portico giving access to the quay, and openings onto the lagoon, which in old French was called (scarcely three centuries ago) *l'orée*, a word derived from *ora*, border, shore (Leuthéric). Joinville used it in his life of St. Louis, "avait fait tendre

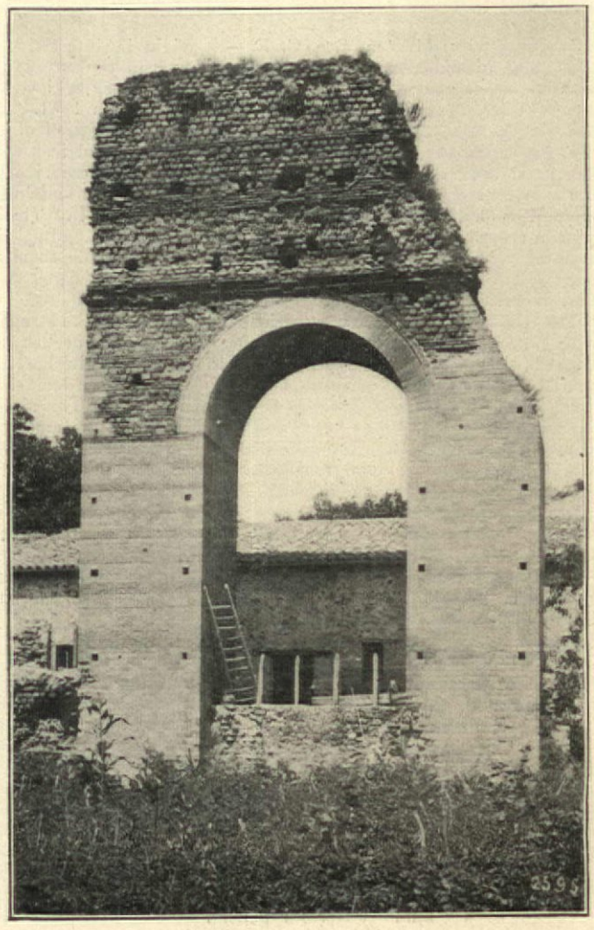
Portion of Aqueduct, Frejus.

ung pavillon sur l'orée du fleuve"; and Rabelais — "Les porte-guidons et porte-enseignes avaient unis leurs guidons et enseignent l'orée des murs." Thus, the theory that it was called Porta Dorée by reason of the richness of the merchandise which passed under it is pure fiction.

Shapeless ruins at each end of the town represent the citadels which frowned upon the harbor, now but a sandy plain interspersed with stagnant pools and efforts towards cultivation. Across one of these fields is the "light-house," so named upon D'Auville's map, but without a snap of evidence to prove that it was ever hollow in the interior. On the contrary, it is quite solid and is thought to have been a sea-mark, the summit of the pyramid being used for a vane or flagstaff. It has a circular base, surmounted by a six-sided prism, on the top of which there is a hexagonal pyramid; and it is possible that the faces of the prism were utilized, like those of the Tower of the Winds at Athens, as sundials; the vane at the summit, indicating the direction of the wind, and thus acting as a guide to vessels entering the port. It is in a perfect state of preservation and marks the end of the great Roman pier. "It is interesting," says M. Leuthéric, "to observe that one of the oldest Greek poets, Leschês, who lived some 630 B. C., describes in his '*Ilias Minor*' a tower of the same kind, which stood at the extremity of the promontory of Sigeium, on the Hellespont, at the time of the Siege of Troy."

The real pharos of Fréjus was opposite, and was constructed very much after the model of the one at Alexandria. It was, unfortunately, destroyed by an earthquake in 1303.

The great principle of the Roman governors as regards building was to give employment to their soldiers in time of peace. Hence, the style of architecture adopted from the Etruscans, the piling up



Roman Ruin, Frejus.

of huge masses of hewn stone without cement and the employment of the arch ceased with the Republic, and in the colonies buildings were constructed of rubble held together by cement. This style of building could be done by any able-bodied men, were they soldiers, prisoners of war, slaves, convicts or freemen.

Fréjus is an example of this style of building. It was done quickly — the whole town, walls, quays and gates were erected in the same manner and of the same material; and though blocks of stone could have been found in the neighboring mountains, this would have required time; so the whole place was built of brick and rubble faced with marble casings and decorations. If a rock came in the way, it was utilized and built in, as was the case in the Amphitheatre, half of it being a mass of volcanic rock. Everywhere there is evidence of speed, and the practical desire of turning everything to advantage.

The greatest wisdom was displayed by the Romans in their water-supply; wherever they passed, we find the remains of aqueducts. Pure water was as necessary to them as pure air is to us. The modern practice of depending upon rivers and wells, in the towns the former frequently sewers as well as drinking-fountains, was unknown to them. At Fréjus a little river some 37 miles off, the Siagne, was diverted across an aqueduct for the supply of the town

— the ruins may still be traced. Part of the way it was a subterranean conduit, the water coming in at the level of the ramparts, and passing under flagstones which encircled the town. The arches had a span of 5 metres, and were 10 or 12 metres high. In some parts a second channel had been made, showing that the first, being constructed too rapidly, had given way.

The remains of the Amphitheatre are sufficient to enable us to judge of its exact dimensions. It is elliptical, 113 metres at the greater, 95 metres at the lesser axis; the arena being 61.71 m. x 39.6 m. It may thus be surmised that the population of Fréjus was about 20,000 to 25,000 persons.

After the Roman occupation had ceased, the town fell into decay, barbarians and Saracens joining in its destruction. The arena became a fortress, and the bishops of the tenth century, in building up a new wall, used up all the old material they required. The port silted up like those of Ravenna, Ostia, Aigues-Mortes, and one of England's Cinque-ports, Sandgate; and now one walks over market-gardens and fields where the 300 galleys cast anchor which were captured by Octavius Cæsar at Actium. S. Beale.

Books and Papers

Mr. Hodgson is very well known as a writer of practical manuals for mechanics, which have had an extensive and well-deserved circulation. The present little work,[1] although less pretentious than its name might perhaps imply, is really modern, and should prove useful to a large number of readers. The first division, which treats of "Carpenters' Geometry," would be improved by more scientific precision, as where an "equilateral triangle" is defined as "a polygon having three sides," omitting the word "regular," or in the description of the ellipse; but the problems given in illustration are well chosen, and ambitious young men will have no difficulty in taking up, later, more scientific and comprehensive treatises on descriptive and applied geometry.

It is, perhaps, inevitable that practical treatises of this sort should seem to the instructed reader rambling and disconnected, jumping suddenly from the geometry of triangles to that of conic sections; from this, again, to problems in descriptive geometry of a tolerably complicated character, and winding up with observations on balloon-framing; but Mr. Hodgson understands thoroughly the experiences of the young mechanic, and is sensible enough to sacrifice smoothness of form for the sake of collecting the solutions of as many every-day difficulties as possible in a single small treatise; and, although not very much can be said about roof-trussing and stair-building, and making compound beams, and balloon-framing, and joinery, and centring, in one small book, which has to contain, in addition, a hundred pages of geometry, what is said is, in most cases, exactly what the young builder needs first to know, and the author refers his readers, where he thinks it necessary, to books from which further information can be obtained. We doubt whether the profession will quite agree with Mr. Hodgson, that "Architects say that the exact measurement for a tread and riser should be 16 inches, or thereabouts." Seventeen to 18 inches would be nearer the mark, and most architects, instead of adding the tread and riser together, multiply them, and take a product between 70 and 75 as limits. This is, however, a detail, in regard to which local customs may vary, and a mechanic working from an architect's plans is, of course, guided by them.

Notwithstanding these trifling criticisms, Mr. Hodgson's little book is one which every young architect, as well as every young mechanic, will find very useful. There is a common notion among draughtsmen that they need not trouble themselves about details of construction, but this is not the opinion of the most distinguished architects, who are generally noted for their ingenuity in mechanical as well as artistic points. Mr. R. Norman Shaw, as thorough an artist as the profession in England has ever possessed, patented, we believe, an improvement in soil-pipes, and Wren was famous as a mechanic. Without attempting to rival these masters, the young architect will find it valuable to him to be able to show the men who work under him, in case of need, how to "saw in" a base-board to fit neatly around a curve, or how to mitre a raking moulding, or a hundred other things which, without his intelligent direction, would be discreditably botched; and in regard to such matters Mr. Hodgson's book gives a great many suggestions, which can soon be learned, and are likely to come frequently into use in the daily work of the young architect, assistant or superintendent.

Memorial Window in Westminster. — When Westminster Abbey was reopened for public worship on Sunday, October 5, the magnificent new rose window which has been placed in the south transept as a memorial to the late Duke of Westminster was seen in all its beauty. Its cost has been covered by a public subscription, which amounted to nearly £2,400. The general subject is "The Preparation of the World for the Great Day," and there are twelve lower lights representing the early Christian preachers and martyrs. The design is by Mr. G. F. Bodley, A. R. A., and the colors chosen are much brighter than those of the old window, in order to improve the light in the rather gloomy Poets' Corner. — *London Telegraph.*

[1] "*Modern Carpentry.*" A Practical Manual. By Fred T. Hodgson, architect. Illustrated. Chicago: Frederick J. Drake & Co. 1902.

Illustrations

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE PORTICO: DEBORAH COOK SAYLES PUBLIC LIBRARY, PAWTUCKET, R. I. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

ALTERATIONS IN THE MAYOR'S OFFICE, CITY-HALL, NEW YORK, N. Y.: TWO PLATES. MR. WM. M. AIKEN, CONSULTING ARCHITECT, BOROUGH OF MANHATTAN, N. Y.

THE WARD-MACKEY CO. BAKERY BUILDING, PITTSBURGH, PA. MR. C. M. BARTBERGER, ARCHITECT, PITTSBURGH, PA.

"ORIGINALITY" AND L'ART NOUVEAU: HOUSE ON THE AVENUE RAPP, PARIS, FRANCE. M. LAVIROTTE, ARCHITECT.

This plate is copied from the *Builder*.

[The following named illustration may be found by reference to our advertising pages.]

LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO.: THE TEXTILES BUILDING; — THE ADMINISTRATION BUILDING; — THE MANUFACTURES BUILDING.

[Additional illustrations in the International Edition.]

THE DEBORAH COOK SAYLES PUBLIC LIBRARY, PAWTUCKET, R. I. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

THE FIRST BAPTIST CHURCH, WATERTOWN, MASS.: THE CLOISTER; — THE AUDITORIUM. MR. C. B. DUNHAM, ARCHITECT, BOSTON, MASS.

THE CHAPEL AND AUDITORIUM IN THE SAME CHURCH.

A COMPETITIVE DESIGN FOR THE CARNEGIE LIBRARY, BURLINGTON, VT. MESSRS. SMITH & WALKER, ARCHITECTS, MONTPELIER, VT.

ST. STEPHEN'S CATHOLIC CHURCH, WARWICK, N. Y. MR. ELLIOTT LYNCH, ARCHITECT, NEW YORK, N. Y.

DETAIL OF ORDER: ST. JOHN'S CHAPEL, VARICK ST., NEW YORK, N. Y.

PULPIT AND ORGAN IN THE SAME CHAPEL.

Communications

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

AN OLD BUILDING-CONTRACT.

New York, N. Y., October 4, 1902.

To the Editors of the American Architect: —

Dear Sirs, — I came across an old building-contract in my grandfather's account-book and enclose herewith a copy, thinking it might be of interest to your readers. Very truly yours,

C. R. McNeil.

Know all men by these presents that I, Salmon Hummiston, of Harwinton, in the County of Litchfield and State of Connecticut, am holden and firmly bound unto Isaac McNeile of Litchfield Town and County aforesaid in the sum of £100 lawful money for which payment well and truly to be made to the said Isaac McNeile, his heirs, executors, administrators or assigns.

I the said Salmon Hummiston bind myself, my heirs, executors and administrators firmly by these presents sealed with my seal dated the first day of November A. D. 1794.

Whereas the above bound Salmon Hummiston hath this day agreed to do the inside joiner work to said Isaac McNeile's new house standing in said Litchfield, Northeast farms and to compleat the lower part of the old house which joins the new one and to finish the chamber flower and stairs of said old house.

Said new house is to be done in the following manner, to wit, in a good, genteel, fashionable manner. The lower South front room to be done in the following manner, to wit, with a good, decent breastwork around the chimney, with cupboards and closets as many as is necessary, with a mop board, chair rail and a cornish spring around the room and wainscot doors and to be lathed fit for plastering.

All the other rooms above and below to be done in the same manner except between the bedroom and kitchen which is to be ceiled on the kitchen side and lathed on the other.

The chamber to be done in the same manner.

The doors of the North room and North chamber to be made with six panels and all the other doors with four panels and good stairs from the bottom of the seller to the top of the garret and all the garret floors to be laid.

Said Isaac is to find the stuff necessary for the completion of the house, and to board said Salmon while doing said house, and said Salmon is to come any time with a fortnights warning. Said work to be compleated by the first of December A. D. 1795. The windows to be well cased all below the garret.

The said Isaac is to give said Salmon Thirty Pounds and Six Shillings. Six pounds of said sum to be paid in cash when the work is done, the remainder to be paid in neat cattle or grain, bulls and stags except one half of said sum to be paid when the work is done, the other half the following fall.

The condition of the above obligation is such that if the above bound Salmon does in all things well and truly keep and perform in manner and form as above written according to the true intent and meaning of the above parties the above obligation to be void, otherwise to remain in full force and life.

Signed and sealed in presence of
WILLIAM BARTLOW, }
ISAAC MCNEILE, JR., } SALMON HUMMISTON.

THE NEW YORK ART COMMISSION AND THE STREET-SIGNS.

NEW YORK, N. Y., October 6, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — My attention has just been called to your editorial on page 66 in the issue of August 30 of the *American Architect*, and I am led thereby to call your attention to the fact that the Municipal Art Society is a body entirely diverse from the Art Commission of the City of New York. The Charter of the City of New York gives no powers to the Municipal Art Society, but does give definite powers to the Art Commission, of which I have the honor to be a member appointed by Mayor Low. Under the Charter it was not necessary for the street-signs to be referred to the Art Commission, but the Mayor or the President of the Board of Aldermen had the right so to do, and they took such action, for which reason the matter of the street-signs has been before, and has been acted upon by, the Art Commission. Yours truly,

HENRY RUTGERS MARSHALL.

NOTES AND CLIPPINGS

THE CUNEIFORM TABLETS FROM NIPPUR. — Professor Herman V. Hilprecht of the University of Pennsylvania, who has been abroad a year and a half engaged in excavating, at the cost of the University, the buried city of Nippur, in Babylonia, has returned to Philadelphia. Professor Hilprecht believes the University expedition has accomplished the most important work so far done at Nippur. "We have unearthed 23,000 tablets," he said, "and I shall make the deciphering of them my life-work. The contents of these tablets will change the ideas of the world as to the state of civilization and knowledge of the early Babylonians. It will be seen that they knew in 2,300 B. C. that the earth was a globe, and that their astronomers took the same view of celestial phenomena as we now take. The inscriptions are in cuneiform characters. Their deciphering is a matter of much difficulty, for we have no Babylonian alphabet; we must not only translate, we must discover the alphabet, which is the key to the translation. Nippur is, in fact, sixteen cities, one built above the other. We have by no means reached the lower of these buried cities. Much of the temple library has been brought here, and is now in the museum of the University. Within the last four months our most important discoveries were made." — *Boston Transcript.*

THE TEXAS MISSION BUILDINGS. — A movement is on foot among the public-spirited women of Texas to preserve to posterity the old Missions of that State, which are fast falling into ruin. Daughters of the Republic of Texas they call themselves, and the various cities have chapters which devote themselves to local work, after the fashion of local chapters of Daughters of the Revolution and Daughters of the American Revolution in the North. The De Zavala Chapter, of San Antonio, is one of the most active of these, partly through the personal initiative of the president, Mrs. Adina de Zavala, who is most enthusiastic over the noble historic and artistic works of the self-sacrificing Franciscans, and partly because San Antonio is peculiarly rich in these interesting remains. Of the five Missions in the vicinity of San Antonio, one — the San José Mission — dates from 1690 and is considered the most beautiful on the continent. The carvings are by the artist Huicar, who was imported from Spain for the purpose of decorating the church. The façade is rich to repletion with virgins and saints, cherubs, sacred hearts, pedestals, canopies and cornices, while one of the windows in the baptistery is said to be the finest gem of architectural ornamentation in America to-day. Among the prominent persons interested in the preservation of these old ecclesiastical buildings is Miss Helen Gould. Miss Gould has expressed her interest by a handsome gift of money to the De Zavala Chapter. — *N. Y. Tribune.*

RESTORING THE FRESCOS ON THE PINAKOTHEK, MUNICH. — One of the uses for which the money recently refused by the Bavarian Parliament to Prince Luitpold is urgently needed is the restoration in some manner of the famous frescos by Kaulbach, Cornelius, Piloty, and other noted artists that adorn the Pinakothek and the Maximilianeum of the Bavarian capital. As all visitors to Munich have observed, these frescos, exposed as they are to one of the worst climates in Europe, are rapidly disappearing. After consultation with the best experts, the Bavarian Government has decided to reproduce these cartoons in mosaic so far as this is possible, and a beginning is to be made with those by Piloty. The cost will be something like $250,000. The offer of Kaiser Wilhelm to pay part of the expense out of his own pocket has so aroused Bavarian resentment that there seems to be no doubt about the money being forthcoming from private subscription should the Parliament persist in its refusal to contribute. All artists are agreed as to the necessity of prompt action. — *N. Y. Evening Post.*

THE "GRACES" ON THE NEW PALACE, POTSDAM. — The New Palace, says the London *Chronicle*, where the German Emperor entertained his distinguished manœuvre guests, is only "new" in the sense that New College, Oxford, is so; that is to say, it was new when it was built, about the close of the Seven Years' War. Frederick, whose Potsdam residence had hitherto been Sans Souci, determined to construct it to show his enemies that his finances had not been exhausted. The chief of these enemies were three women — Maria Theresa, the Empress Elisabeth and La Pompadour — and when his new palace was finished, Frederick, with bitter mockery, surmounted it with a crown supported by the nude figures of these three illustrious ladies, each with her back turned toward her own country. They are there to this day. Emperor Frederick, who was born and died in the palace, renamed it "Friedrichskron," though one of the first things done by his son, on succeeding him, was to decree the restoration of its old title.

DISCOVERY IN THE ROMAN FORUM. — Two tombs of great antiquity have been discovered in the Necropolis in the Forum early in the month of October. — *Exchange.*

HOUSES CARRIED SEVENTY MILES ON FLATBOAT. — While doing a bit of surveying in East Camden, N. J., Assistant City Engineer Sayrs was surprised to find on a lot which was vacant on his last trip to that section two frame houses, 15′ x 24′, and three stories high. They were situated in Buren St., between Twenty-seventh and Twenty-eighth Sts., about 300 feet from the river. Having received no report from the city-clerk's office of a permit for the erection of the houses, and knowing that it was an impossibility to have built them in the time after his last visit, Mr. Sayrs knocked on the front door of one of the houses. A German responded, and in answer to questions said that he and a fellow German, who owned the other house, had removed them to this city from Reading, Penn. A flatboat, he said, was used in transporting the houses down the Schuylkill, into and up the Delaware, a total distance of about seventy miles. — *N. Y. Tribune.*

THE CATHEDRAL OF GOTHENBURG. — The Cathedral of Gothenburg, "the Swedish Venice," which threatens to share the fate of the Campanile, is only a hundred years old. It burned down in 1721 and again in 1802. — *Exchange.*

SPONTANEOUS COMBUSTION OF SOOT. — A recent incident which occurred in Macon, Ga., shows the great danger from spontaneous combustion and how it will sometimes develop under the most unexpected circumstances. The soot and other refuse which had accumulated from cleaning a tubular boiler was thrown into a pile outside the boiler-house. A few hours later it was found to be on fire, and had it not been discovered in time would have set fire to the building. Upon investigation it was found that there could not have been any fire near the soot, but that there had been a slight rain followed by several hours of bright sunshine. The heat of the sun's rays aided by some chemical action in the soot itself must have caused spontaneous combustion. — *Fire and Water.*

VENETIAN WORKS OF ART. — In the province of Venice there are 1,111 art-works under the guardianship of a special committee, which however, has at its disposal only 13,500 lire, or about $2 a year for the preservation of each monument! — *N. Y. Evening Post.*

VENTILATION IN TUNNELLING. — For every cubic foot of air that was sent into the St. Gothard Tunnel a quarter of a century ago, 50 cubic feet are being introduced into the Simplon Tunnel. The mortality, in consequence, is much lower. — *Exchange.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, OCTOBER 18, 1902 No. 1399

CONTENTS

SUMMARY: —
Why should the American Iron Trade gain over the British? — The Coal-strike Situation. — The Coal-measures in Massachusetts and Rhode Island. — The New York Hall of Records to be taken down. — The Malaria in the Roman Campagna. — Redeeming the waste Places of Apulia by Irrigation. — Whitewashing Tar-and-Gravel Roofs. — The Liverpool Cathedral Competition. — The Nile Dam at Assouan. 17
RELATIVE PERMANENCE OF STEEL AND MASONRY CONSTRUCTION. — II. 19
THE TOWER OF ST. MARK. 20
BOOKS AND PAPERS. 21
AUSTRALIAN SOFT WOODS. 22
ILLUSTRATIONS: —
The Red Swan Inn, Warwick, N. Y. — The Courtyard: House of E Rollins Morse, Esq., Newport, R. I. — A Competitive Design for the Carnegie Library, Nashville, Tenn.
Detail of Staircase, Nassau House, Bath, Eng.; — Doorway to Beau Nash's House, Bath, Eng.
Additional: The Roman Catholic Cathedral, Westminster, London, Eng. — House of E. Rollins Morse, Esq., Newport, R. I. — Entrance to Estate of E. Rollins Morse, Esq., Newport, R. I. — The Rood-screen: All Saints', Great Neck, Long Island, N. Y. 23
NOTES AND CLIPPINGS. 23

THE Boston *Herald* makes some judicious observations on the report of a committee of British manufacturers, who recently visited this country, to ascertain, if possible, the causes of American success in taking away the iron trade from them. The committee found that the chief cause of the superiority of the Americans lay in the excellence of their machinery, which, by enabling a man to accomplish an immense amount of work, reduced the labor-cost on the product. Thus, they found that, in rolling steel bars, so much is now done by machinery that the labor-cost, per ton, is only a small fraction of what it was ten years ago; and, in making rails, beams and other shapes a similar reduction in cost has been effected. All this is, undoubtedly, as true as it is interesting, but the *Herald* asks, very pertinently, who it is that gains by the introduction of all this labor-saving machinery. It is certainly not the consumer, who, in this country, pays more for his rails, or bars, or beams, than he did ten years ago, when, as we are told, the cost of making them was far greater; and the *Herald* concludes that the saving is all diverted into the pockets of the manufacturers, who are enabled, by means of it, to pay interest on vast issues of speculative securities, the sale of which has served to enrich a good many people, and, we hope, will not serve to impoverish a good many more. Undoubtedly, it is fair enough that the people who introduce economies in their processes and machinery should profit by them, but the natural course of events is that the competitors of the people who first introduce them invent new economies, to enable them to compete for customers with their rivals; and, in the end, the public gets a reasonable share in the advantages secured by such improvements. In many branches of American industry this has been the result, and it is probable that a falling-off in the demand would reduce in the same way the cost of iron. Meanwhile, it is due to the management of the United States Steel Company, which, as the largest and most conspicuous manufacturing corporation in the country, receives a good deal of abuse which is quite misdirected, to say that its policy has always been, not to take advantage of the necessities of its customers to extort high prices, but to keep prices down to a moderately remunerative point; and this policy, pursued with discretion, ought to save it from the violent shocks which are as disastrous, in the end, to consumers as to producers.

ALTHOUGH the great coal-strike seems in the way of settlement, through the intervention of Mr. J. Pierpont Morgan, it is likely that a measure for the repeal of the duty on coal, which the Administration is known to favor, and which is supported by a strong popular sentiment, will be carried through Congress in December. Whether the repeal will result in any large importation of anthracite depends on the price of the Pennsylvania product; but there is a great deal of anthracite in the world, in France, Germany, Wales, Scotland and Canada, and high prices, with the duty removed, would undoubtedly attract it here. Even if the "round coal" could be brought to our seaport towns more cheaply from Pennsylvania, it is not impossible that a traffic might be built up in the "boulets d'anthracite," which are made in France and Germany of the dust from the anthracite mines, and are sold very cheap. The people of New England, in particular, seem to have become convinced of the fact that they are not fairly treated in the matter of fuel, and are likely to be more open in future to propositions for a better and cheaper supply than they have been hitherto.

SO many people have made inquiries of us in regard to the Massachusetts and Rhode Island anthracite that it may be of interest to give some further information. In all, twelve mines have been opened into this anthracite bed, which covers an estimated area of five hundred square miles, including the whole State of Rhode Island, and extending into Massachusetts as far as Worcester. The coal varies in quality from that found in Mansfield, which contains only four per cent of ash, to the deposits at Worcester and Providence, where it is in great part converted into graphite, so that the product of a mine now worked in Providence is said to be ground up and sold for stove-blacking and lubricating paste. All the mines in Massachusetts, consisting of three in Mansfield, one in Wrentham and one in Raynham, have been abandoned, but one of the mines at Portsmouth, R. I., has been worked intermittently for many years. From this mine seven hundred and fifty thousand tons of coal have been produced and sold; and the quality of the coal was for a long time regarded as so good that it brought a higher price, at the mine, than any other anthracite in the United States. Early in the history of the mine, the Portsmouth coal was sold, at the mine, for five dollars a ton for "round" coal, and half that for the "slack," but this was soon reduced to three dollars for the round coal, or coal in lumps, such as is used for domestic purposes, and fifty cents to a dollar for the slack, and at these prices the operation of the mine was found for many years profitable. It appears that the discouragements attending anthracite mining, both in Rhode Island and Massachusetts, have not come from any inferiority in the quality of the coal, but from the irregularity of the veins, which, though thick, reaching twenty-three feet in Mansfield, and thirteen in Portsmouth, vary greatly within short distances. Whether these irregularities would make it impossible for the New England mines ever to be permanently worked with profit on a large scale, in competition with those of Pennsylvania, is uncertain, but the fact that one of them, at least, has successfully met that competition for half a century, and that the quality of the coal improves with the depth of the vein, suggests, at least, that at the present time, when the price of Pennsylvania anthracite in New England and New York is about three times the average for the last twenty-five years, and is likely to remain far above that average for many months, an effort might be profitably made to extend the workings, and introduce the economies incident to operation on a large scale, so as to render New England permanently independent of Pennsylvania anthracite.

THE old Hall of Records in New York is to be taken down immediately, by order of Justice Leventritt, of the Supreme Court, on the application of the Corporation Counsel. The building is close to the excavation of the new rapid transit subway, and the sand on which its foundations rest is in danger at any moment of escaping into the subway trench, so that its removal is a matter of necessity. Although it has some historical interest, the structure is of no value otherwise, and would soon be superseded by the new Hall of Records, now building. Meanwhile, it is a disfigurement and encumbrance to the City Hall Park, and would be better out of the way.

PROFESSOR KEUSSMANN, of the Wilhelm-Gymnasium, at Hamburg, delivered an interesting lecture recently before the Society of Architects and Engineers of Hamburg, on the Roman Campagna. Every one knows that this district, now the reproach of Italy for its deadly malaria, was, in antiquity, a beautiful and healthy region, filled with farms and

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

villas. The change to its present condition has been ascribed to all sorts of mysterious moral, as well as physical, causes; but Dr. Keussmann says that the simple solution of the mystery is that, in the times of the Roman Republic, the land was carefully drained by means of a network of underdrains which still remain. In some places, where the ground was naturally unfavorable, four sets of pipes have been found, one above another, the lowest being more than fifty feet below the surface. Under the Empire, the system of farming in Italy, as all students of history know, was gradually changed. The small estates, kept in good condition by thrifty freeholders, were gradually bought up, and consolidated into vast "latifundia," or ranches, owned by great city capitalists, and cultivated by slaves, under the charge of an overseer. It is impossible to carry on with slaves the diversified and careful tillage which small proprietors find profitable, and the "latifundia" sank into the condition of our Southern plantations under slavery, all the more enlightened details of the system of farming formerly pursued being neglected. The drains, which the slaves knew nothing about, and their overseers cared nothing about, were allowed to choke with mud, and the ground soon became as saturated and foul as ever. As crops could not be grown in water-soaked soil, the more marshy portions were devoted to pasturage, and the few remaining people of intelligence fled from the increasing malaria. It is curious that, even now, although fifteen hundred years of misery have made the name of the Campagna a synonym for wretchedness and crime, its condition is worse, perhaps, than ever, and from the same causes. The present proprietors of the land are still, for the most part, the members of the noble Roman families, who display about the same business energy and interest in their property that the Senators and courtiers who preceded them did. In order to save themselves trouble, they have, very generally, let their Campagna estates, on long leases, to speculators, who, instead of cultivating them, or spending any money in reclaiming them, find it most profitable to leave them barren, and even to clear away what remains of habitation they may find, to make room for vast flocks of sheep, which roam over the hills and marshes, under the charge of a few half-savage herdsmen, brought from the miserable mountain villages of Umbria. The number of herdsmen required is so small that the actual density of population in the district under the very shadow of St. Peter's is substantially the same as that in the Pampas of Argentina. These wild men, the "sandalled ones," as the Romans call them, have no houses, living in huts made of cornstalks, or in holes dug in the ground. They have a superstitious dread of malaria, whose effects they know only too well, and, to ward off the "evil air," they kindle fires of rubbish near their huts, which, of course, serve only to attract swarms of mosquitoes, bearing infection with them. In the whole Campagna there are only eighteen official physicians, so that the public health receives practically no attention whatever; and the Italian Government, although it understands the condition of the district, has not felt itself strong enough to take any effective means for remedying it.

THE scheme, which is said to be due to the lamented King Humbert, of Italy, for supplying water to the dry regions of Apulia is to be carried out, the necessary legislation having been completed. The water is to be taken from springs high up in the Apennines, and is to be conducted through a main aqueduct, nearly two hundred miles long, eight miles of which is carried by a tunnel through the ridge of the Apennines to the edge of the Apulian plain. Here the aqueduct divides into many branches, which serve one hundred and ninety-four villages, containing seventeen hundred thousand inhabitants, situated in the provinces of Foggia, Bari and Lecce. The total length of the branches is forty-three hundred miles, and the cost of the undertaking is estimated at twenty-seven million dollars. The people of the territory to be supplied are among the poorest and most wretched in Italy, so that no attempt will be made to earn interest on the investment, by means of water-rates, fountains being simply established in each village for public use.

A FIRM in Germany, taking a hint, perhaps, from the people in the suburbs of Lyons, who whitewash even their tile roofs, has prepared a cheap white paint, apparently containing Portland cement, which is put with a brush directly over the tarred felt roofs so popular there. A roof of tarred felt, without the covering of gravel commonly used in this country, becomes intensely heated in summer, through the absorption of the rays of the sun, and heats the rooms under it; and the manufacturers of the new paint claim, probably with reason, that the rooms under a roof covered with it are much cooler in hot weather, while the paint, by protecting the tar in the felt beneath it from the sun, prevents the evaporation of the volatile constituents of the tar, and this prolongs the life of the roof. In New England, where the sun's rays have less power than they have farther south, and where the white gravel generally used over a tarred roof reflects much of the heat, roofs of this kind are popular and satisfactory; but in New York and Philadelphia they are considered to deteriorate rapidly, and it seems as if a good coat of cement whitewash might do much to protect them, and to extend the use of what is, under favorable circumstances, one of the best and cheapest of roofing-materials.

THE first stage of the competition for the Liverpool Cathedral has been completed by the selection of five, out of the one hundred and three competitors in the preliminary trial, for invitation to compete again. These five are Messrs. Austin & Paley, of Lancaster, and Messrs. C. A. Nicholson, George Gilbert Scott, Malcolm Stark and W. J. Tapper, of London. Of these, Messrs. Austin & Paley, George Gilbert Scott and Malcom Stark are well known to fame, even on this side of the Atlantic. Mr. Tapper is somewhat prominent in the profession in England; and Mr. Nicholson appears to be comparatively a new man. He must, however, be a man of great ability, for, besides the award of selection for the second competition which he wins by one of his designs, a second design, also submitted by him, receives honorable mention.

THE *Builder* gives an interesting account of the great dam across the Nile, at Assouan, now just completed. It will be remembered that, when the project of storing the flood-waters of the Nile was first discussed, a site was selected for a dam just above the First Cataract, and a little below the Island of Philæ, where the river passes between high, rocky banks. A dam could be built here, sixty feet high, giving ample storage of water for many years; but the ruins of the Philæ temples, which stood just above the dam, would be completely submerged; and, in deference to the universal outcry against destroying these monuments of antiquity, the plans were changed, so as to make the dam much lower. It is this last plan which has been carried out; and, although the Temple of Hathor and the Nilometer will be entirely under water during the three months of flood, the Temple of Isis will be covered only to the floor. Considering that the new dam will give much less than one-third the storage capacity of the one originally projected, so that the water must be used with great economy, it may be questioned whether the Egyptian peasants have much reason to applaud the scruples of the archæologists, especially as the soaking of the mud and silt on which the ruins of Philæ stand is likely to destroy them before many years; but it is too late to make any change now.

SOME of the circumstances attending the execution of this great work have a curious air. We are told that, for the sake of economy, no trial borings were made to test the ground on which a dam a mile and a half long was to rest, it being comfortably assumed that "sound rock would be found everywhere at a convenient level." Unfortunately, this assumption was not confirmed, and, after the contract was signed, an immense amount of extra foundation work had to be done, to carry the footings down to solid ledge through the "rotten granite," and masses of "micaceous schist, of a very friable nature," which existed in various places. Notwithstanding these troubles, the work seems to have been carried through with characteristic British persistency and thoroughness, and the engineers and contractors have good reason to be proud of what they have accomplished. A novelty in water-storage, which it was necessary to provide for, arose from the necessity of allowing the first waters of the Nile flood to escape through the dam. It is these waters which bring down the fine silt on which the fertility of the Nile valley depends; and to cut it off would be to ruin Egyptian agriculture. For this reason, an immense number of sluices are provided, near the base of the dam, which are opened when the first flood-waters appear, and kept open until the "red water" has been succeeded by that clearer product of the melting snow on the Mountains of the Moon. Then they are closed, and the clear water allowed to accumulate, to serve, later, for simple irrigation.

RELATIVE PERMANENCE OF STEEL AND MASONRY CONSTRUCTION.[1] — II.

W. HILDENBRAND, M. Am. Soc. C. E. — With reference to the old Roman viaducts and aqueducts mentioned in this discussion, which are frequently quoted as evidence of the longevity of stonework and its superiority over iron structures, the speaker wishes to draw attention to the fact that in other Roman structures may be found equal evidence of the durability of iron. Remnants of bridges over the Rhine, built by Julius Cæsar, have been dug up during the past fifty years, while the work of regulating the bed and current of the Rhine has been going on. In Cæsar's "*Commentarii de Bello Gallico*" one of these bridges is minutely described, corresponding in construction to what would now be called a timber trestle, consisting of heavy oak logs connected with iron bolts, clamps and spikes. Quite a number of these logs were found under the bed of the river, nearly 2,000 years after they had served for carrying the Roman legions over the Rhine in their attempt to subjugate a free nation, and the timbers, as well as all iron bolts and spikes, were in a perfect state of preservation.

This fact corroborates Mr. O'Rourke's assertion that iron submerged in pure water will probably never corrode.

Of course, every object in this world perishes, or, rather, disintegrates and changes into some other form; but, if building materials can be preserved for several thousand years, it may be said that, for all practical purposes, they last forever.

The question whether metal will in the future be considered as permanent and durable a building material as stone cannot be solved at the present time, and it is not likely that any who are here will live to see it solved. The answer to the question cannot be found by theorizing, but depends entirely on experience, which should extend over centuries.

At present we have, so to say, no experience at all about the durability of iron or steel structures. It is barely sixty years ago that the first iron bridges were built, and it is doubtful whether a single one of that age is in existence to-day. Nearly all the early iron bridges have been removed and replaced by modern structures, not on account of having been decayed or weakened, but because they had outlived their usefulness, and stronger ones were required to accommodate the increased and heavier travel of modern times. Our experience as to the durability of iron and steel structures, therefore, is very limited, and only of recent date.

If a stone building and a steel building were erected side by side, and both structures were left to themselves, without any attempt to protect them against the effects of the atmosphere, there is no doubt that the stone building would stand very much longer than the steel building. In New York City there is an example in the New York and Brooklyn Bridge. The massive stone towers, which are now more than twenty-five years old, have no protection against the weather and have never been repaired. They are to-day as they were left by the hand of the mason twenty-five years ago, and according to a recent thorough inspection, they are just as good and perfect as they were on the day they were finished. On the other hand, the steel and wire work requires constant attention; there is hardly a time when no men are seen suspended in the meshes of the wirework repairing something or putting on a coat of protective paint.

The speaker has had the opportunity of examining suspension-bridges erected more than forty years ago, and while he found the cables, as a whole, in perfect condition, he also discovered one or two places where, through the accumulation of water or through imperfections in the protective paint, the wires were considerably corroded and needed repairs. All of this shows that metal structures require attentive watching and constant renewal of paint or other protective coverings, and that any oversight or inattention is followed by grave consequences.

With our present knowledge, therefore, we may sum up by saying that unprotected masonry, as well as unprotected ironwork, is perishable, but that the former will last much longer than the latter. However, if iron or steel be well protected, it is known that it will not decay in thousands of years, and will be as durable, if not more durable, than any stonework. Will the means for an efficient and permanent protection of steel ever be discovered, or will a new metal be found which has the same strength as steel and which naturally is not subject to oxidation?

H. S. HAYNES, M. Am. Soc. C. E. — Mr. Hildenbrand has referred to iron bolts in bridges built by Cæsar across the Rhine. In the Colosseum, built about A. D. 80, the courses of heavy travertine masonry, laid with knife-edge joints, without mortar, were connected by iron cramps fairly well protected from the weather. Many of these were cut out in the Middle Ages, but those which remain appear to be in good condition. The vault of the Pantheon, 140 feet in diameter, is of concrete supposed to be strengthened with iron rods. This vault, built about A. D. 125, is, to all appearances, in excellent condition. From these instances, it would seem that iron, used structurally in connection with stone or concrete masonry, may remain efficient for nearly 2,000 years.

Iron is not readily oxidizable in pure water, for the oxygen therein chemically combined is only separable at an excessively high temperature. It is the atmospheric oxygen ordinarily present in water that is the oxidizing agent. Water absorbs carbonic-acid gas to an extent equal to its volume, and the water thus acidulated acts powerfully upon iron or steel. It follows that in large cities where the atmosphere is heavily charged with the products of combustion, the falling rain would be correspondingly charged with carbonic-acid gas, and, therefore, that the effect of oxidization upon steel construction should be proportionately greater from exposure under such conditions.

A. L. JOHNSON, M. Am. Soc. C. E. — In reference to a statement concerning the corrosion of the steelwork in the large buildings in Chicago, C. T. Purdy, M. Am. Soc. C. E., was one of the members of a Commission to examine and report on the condition of those buildings. The speaker having talked with Mr. Purdy recently concerning this matter, it may be appropriate to give some of the results as described by Mr. Purdy. His report has undoubtedly been printed ere this, and probably, therefore, there will be no objection to the promulgation of the information at this time. The Commission examined quite a number of the buildings in Chicago and found numerous cases of corrosion in the columns; but it was not developed that the corrosion was confined to the outside columns, or even that it was greater in them than in the interior columns. The beams in the foundations, Mr. Purdy said, were found to be in uniformly good condition. The Commission's recommendation would be that in future all the steelwork for these buildings should be entirely surrounded by a Portland-cement or lime mortar, this covering being filled-in solid behind the fireproofing.

In St. Louis a very well constructed building, erected about twenty years ago, is now being dismantled. The construction consisted of solid external walls, cast-iron columns throughout the interior, and steel beams painted with red oxide-of-lead paint. The building was eight stories high, and of fireproof construction, the floor-arches being mainly of brick, though there were also some concrete arches. The steel throughout is in a thoroughly well-preserved condition, it having been in all cases entirely embedded in Portland-cement mortar or concrete covering. The paint also has been thoroughly preserved, and in the speaker's estimation an embedment in Portland-cement mortar is the only means of preserving that preservative.

Professor Spencer Newberry, Manager of the Sandusky Portland-cement Company, recently gave a lecture[2] in Chicago, which the speaker regards as one of the most valuable articles, with regard to steel-concrete construction, that has appeared in print for some time, covering, as it does, all sides of the question, and some sides in an entirely new manner, such, for example, as the theoretical considerations involved in the preservation of iron by Portland-cement covering. In this article he shows that the cement, theoretically, is not simply a neutral or non-injurious agent, but is actively engaged in preventing the formation of rust.

The speaker's company has samples of steel embedded in cinder-concrete, in the form of broken pieces of a test span, made in the fall of 1898, and tested in February, 1899, these pieces having lain on the ground uncovered, subject to the action of the elements, for more than three years. On numerous occasions these pieces have been broken open for the purpose of observing the condition of the metal, the most recent case having been before the Engineers' Club of St. Louis, last January, in connection with a talk given by the speaker; and in all cases, without any exception, the metal has been found to be as bright and clean as the day it came from the rolling-mill. The quality of the cinders in this sample was considered very poor, containing a good deal of dirt, and the fine material was screened out. This the speaker regards as desirable, though not absolutely necessary, where cinder-concrete is used, inasmuch as, if it is not done, a slight film of rust will be formed on the metal. This film, however, never increases in thickness, but, as it costs little to avoid it, the best practice would call for the screening of the cinders. In the speaker's opinion, the reason for this difference in action is due to the fact that the fine stuff contains finely divided particles of sulphur, which are readily dissolved by water, slightly acidulating the same, and, until the concrete dries out thoroughly, a slight corrosive action is taking place. This is soon neutralized by the influence of the Portland-cement, but not before a film of rust, not in itself materially injurious, is formed.

Mr. Darrach has expressed himself as of the opinion that at the present time we are not able to calculate the strength of steel-concrete beams with any degree of accuracy. The speaker, of course, will have to take exception to that statement, he having on numerous occasions endeavored to show how this could be done, and, being of the opinion that the data with regard to the materials used being known, he could arrive at the maximum carrying capacity within about 15 per cent, which is certainly close enough for all practical purposes, in view of the factor of safety used. Of course, the strength and the modulus of elasticity of the concrete and steel must be known, and, as to the former material, these functions are seldom accurately known, chiefly because no special tests are made to determine this for the materials available for that particular work. Their influence on the character of the design is enormous, and, on work of any considerable size or importance, these values should be obtained before the designs are prepared.

As to the relative lasting qualities of the different kinds of engineering structures, the speaker is of the opinion that only a few forms

[1] An Informal Discussion at the Annual Convention, May 21, 1902, of the American Society of Civil Engineers and printed in the Society's *Proceedings* for August, 1902. Continued from No. 1398, page 13.

[2] Before the Annual Meeting of the Associated Expanded Metal Companies, and reprinted recently in *Engineering News*.

of stone masonry can compare in length of life with a concrete construction reënforced with steel properly distributed through the cross-section. Strange as it may seem to those not conversant with the facts, the maintenance-charges for stone masonry, on many railroads, exceed these charges for steel structures in proportion to the relative quantities of each. On railway work it is usually a condition of taking what you can get, rather than what you would like to have. Many forms of sandstone are worthless. Limestone is dissolved in the course of time by atmospheric influences, and there are really only a few kinds of stone that can be considered as everlasting, and these are usually so expensive as to prohibit their use. A very good example of the dissolution of limestone masonry is afforded at the Cabin John Bridge. Underneath the arch may be noticed stalactites forming along the line of the mortar joints between the granite arch-stones, from the spring-line so ne distance up toward the crown. The back-filling of the arch consists of a considerable depth of limestone-rubble masonry. A considerable quantity of water finds its way down through the haunches of the arch and then through the mortar joints of the arch-ring, and the stalactites indicate that the air and water are dissolving this limestone backing. This same action exists, to a greater or less degree, in all limestone structures.

In a large city in Indiana the speaker recently examined some limestone bridge-masonry which had been in place for about forty years, and much of it could now be scraped up with a fire-shovel.

In the speaker's opinion, plain concrete construction would not be everlasting, on account of the cracks which are almost certain to develop in such structures, these cracks filling with water and freezing in the winter, and gradually getting worse and spawling off as the years go by.

In steel-concrete construction, if the metal is properly distributed and proportioned to the cross-section, these cracks can be absolutely prevented. The speaker's company has built walls 300 feet long, with steel reënforcement, in which no expansion-joints were provided, and in which not a sign of a crack is to be seen; and would take a contract to build such a wall a mile long, under this guaranty.

To accomplish this result, however, it is necessary to have a subdivision of the metal reënforcement into small areas thoroughly disseminated through the section, just as in successful arch-construction it is necessary to have the metal thoroughly disseminated in small areas through the upper and lower portions of the sections. Heavy concentrations of metal at points 2 or 3 feet apart will not give the peculiar stretching quality to the concrete obtained by the other method, and which is essential to success.

When properly built, this steel-concrete construction will not crack; will not be disintegrated by frost; will not be dissolved by the elements; and, in the speaker's opinion, is the only kind of engineering structure that can be considered permanent, with the exception of one or two kinds of rock masonry, the cost of which in most cases would be prohibitive.

F. Lynwood Garrison, Assoc. M. Am. Soc. C. E. — Since there seems to be some confusion or misunderstanding regarding the corrosive action of atmospheric and other influences upon iron, it might be advisable, in this discussion, to state briefly a few of the most important characteristics of metallic iron that are pertinent to the subject, although, in so doing, the risk of repeating some well-known facts must be incurred.

1. To begin with, iron is one of the metals most easily oxidized and affected by moisture, consequently it never occurs in the metallic state.[1]

2. Iron does not undergo any alteration in pure dry air at ordinary temperatures.

3. In moist air iron becomes coated with ferric oxyhydrate having approximately the composition $Fe_4O_2(OH_6)$. The rust varies in composition with the conditions under which corrosion takes place.

4. According to Percy, iron does not rust unless there is an actual deposition of liquid water upon the surface of the metal.[2]

5. The presence of certain gases and vapors, even in minute proportions, such as sulphuretted hydrogen (H_2S), hydrogen, chlorine, and acetic acid, accelerates rusting in moist air, though no liquid water may come in contact with the metallic surface. Carbon dioxide (CO_2) and ammonia gas are said to act less energetically in this respect.[3]

6. Iron rust often contains minute quantities of ammonia, due, it is supposed, to the decomposition of the water by the action of the oxide on the metallic iron, the oxygen combining with the iron, and part of the hydrogen uniting in the nascent state with the nitrogen of the air.

7. Pure water deprived of air appears to be absolutely inert, as far as corrosive action is concerned, on contact with iron, even at 100 degrees Cent.[4]

8. Rust formed far beneath the water consists of black hydrated magnetic oxide.

9. The formation of rust takes place in the beginning but slowly; after a thin coating has once been formed, the corrosive process goes on more rapidly.

10. Aqueous solutions of potash, soda and ammonia preserve iron from rusting, provided they are not too dilute.

11. Water containing not more than one-fifth its volume of lime-water is said to preserve iron from rusting.[5]

12. The contact of iron with more electro-positive substances, such as zinc, retards corrosion; whereas contact with more electro-negative substances, such as tin, lead and copper, accelerates the rusting.

13. Magnetic and similar oxides of iron, which constitute the basis of iron scale, protect the iron which they coat, but hasten the corrosion of rusted iron, whether such be the adjacent portions of the same piece or in separate pieces which are galvanically connected. This protective action is shown by the comparatively slow rusting of Russian sheet-iron, of "blued" iron, and of castings that retain their original skin.

14. While contact with zinc and highly zinciferous brasses retards rusting, contact with copper, or brasses rich with copper, hastens it.

15. According to Martell, the purer qualities of mild steel when used in ship-hulls are more likely to be corroded than impure iron. A steel ship requires more care than an iron one. Nickel steel is not so likely to be corroded in salt-water as the ordinary and purer grades of steel.[6]

This array of more or less well-known facts might be indefinitely elaborated; however, it covers the subject completely in a general way. It seems to be a perfectly sound conclusion that, other things being equal, where likelihood of corrosion is effectually prevented, iron (steel) makes as permanent and durable a building material as masonry. Better, in fact, for, whereas the latter will certainly, in time, disintegrate, the former cannot. Unusual conditions may certainly exist in which the molecular structure of the metal may change; such, however, must be regarded as abnormal and exceptional.

A statement has been previously made in this discussion to the effect that, inasmuch as iron properly covered with fireproof material or concrete will not corrode, uncovered iron in the interior of buildings will be immune from corrosion because it is then covered from the weather on all sides. Were walls and roofs absolutely water or moisture proof, in fact, if the buildings were hermetically sealed, top, sides and base, then, and then only, would the interior metal be free from corrosive influences. As a matter of fact, in most cases, the danger from corrosive deterioration are much exaggerated; the greatest objection to steel buildings is their instability in fires. Mild steel, at a white heat, is about as stiff as cheese, whereas masonry is not affected in the same way at high temperature, and resists collapse to a far greater degree.

The speaker's belief is that, in practice, a thick covering of cement-concrete is the only material that absolutely protects iron from corrosion. Such a compound structure unites the advantages of both component materials, and greatly surpasses in strength and durability an edifice made of either alone.

All are familiar with the remarkable strength and endurance of "wire-glass," the glass sheet being cast and rolled so that the wire net is completely covered with the glass, imparting to the natural fragility of the latter a certain amount of elasticity and abnormal strength; the glass, in turn, absolutely protecting the wire from corrosion. So long as the wire is covered, such a composite sheet will hold together, unless broken by a force greater than the tensile strength of the wire.

Not being a structural engineer, the speaker may be unfamiliar with certain objections to composite concrete and metal structures; in his ignorance, however, he cannot but think that such compound constructions will be the true and logical line of development in the future.

[1] Exceptions must be made where the iron is of undoubted meteoric or non-terrestrial origin. In such instances, it is usually alloyed with a large proportion of nickel.

[2] "*Metallurgy of Iron and Steel*," p. 27.

[3] Bonsdorff, "*Répertoire de Chimie*," Vol. 4, p. 171.

[4] Mallet, Rept. British Assoc., 1840, p. 229.

[5] "*Gmelin Handbuch*," Vol. 5, p. 185.

[6] *Journal*, Iron and Steel Inst., No. 1, 1889, p. 66.

THE TOWER OF ST. MARK.

THERE is still to be seen on the Piazza of St. Mark a lamentable mass of ruins containing all that is left of the bell-tower of the Venetian Republic; but busy hands are rummaging amongst this mass of rubbish, this dusty pile, for the sake of withdrawing from it any uninjured pieces of the Campanile, and the great court-yard of the Ducal Palace is transformed into an ossuary where are already accumulated the scattered members of the colossus. These members, bas-reliefs, bronzes, statues and decorations are here carefully grouped together, awaiting resurrection. One might call them an image of a monument painfully sketched-out as in a dream, a maladroit evocation. One might imagine that these works of art gathered together here are fatigued through having been throned on high during long ages over the grand public place of Venice, and are disturbed at the idea that they must again take their place in the eye of the sun.

One of the bronze statues from the Loggetta, Minerva, has lost her buckler; her sword is broken, her casque is cleft by a terrible blow. Apollo, headless and dismembered, lies on the ground; Mercury is disfigured, and has lost his nimble hands. There are also a certain number of statues which the most painstaking effort will hardly succeed in curing of the wounds caused by their fall, and fitting them for a place on the new pinnacle, which is going to be erected for them.

You doubtless know that the engineer, Signor Giacomo Boni, has been summoned to Venice, and ordered to prepare for the rebuilding of the historic tower. From the Roman Forum, where he

was directing the new excavations with extreme ability — where he has already made some astonishing discoveries, the young engineer has gone to care for the Venetian Forum — that group of monuments of a different epoch, to be sure, but one which equally recalls several fair pages of history, and at the same time is a precious necklace of artistic treasures. A link has given way under the weight of time; the Campanile has crumbled, and Signor Boni has begun his work by carefully picking over the ruins.

It is only in the early days of the month of October that an ending will be made of cleaning up the Piazza. The thing which makes the work difficult is the fact that the tower, which was unwilling to throw itself upon St. Mark's, or upon the Ducal Palace, has buried under its ruins a portion of the arcade of the Royal Palace. It might have dragged them down in its own fall, if it had had less thought for the surrounding monuments. It will be necessary, therefore, before disinterring this arcade, to shore it up in some fashion, after the Piazza is cleared up; and before laying the foundations of the new tower, it will be necessary to make excavations, so that a study of the structure of the sedimentary deposit may be made, and any defects in the old foundations laid bare. These excavations will extend through a zone of about 6 metres beyond the old foundations of the monument, and will go 4 metres below them. The second portion of the work, having to be carried out with extreme care, cannot be finished before next spring; then the new foundations will be laid, with an area of from 200 to 400 square metres, on ground consolidated by piles which are to be driven by the quiet and non-disturbing action of hydraulic pressure.

It is natural that investigations into the stability of the Venetian soil, the sinking of the ground-level, its movement, its former undulations, and those which are still to be feared, should have to be carried out with extreme slowness. Fortunately, they have discovered an aid of extreme importance — a bench-mark; on the third gradin, at the left of the entrance to the Campanile, there has been discovered an ancient mark indicating the sea-level. Thanks to this mark it will be possible to know whether there has been any sinking of the foundations of the tower, and as well, whether other parts of Venice have sunk also. As it is a question of level, in relation to the primitive level of terra firma, they now have a new factor for studying the problem of the general subsidence of the islands in the Lagoon, a problem of capital importance for Venice, whenever the stability of its monuments are considered.

This subsidence of the ground-level is a fact abundantly proved. It is now only necessary to determine how important a factor it is. The level of the Roman paving in Venice lies 2 metres below the present level, while the level of the mediæval pavement lies only 1.70 metres below, and this gives a coëfficient of geological subsidence of 9 centimetres for each hundred years. The phenomenon is one of great importance, and it is time that the Venetians took proper cognizance of it. As to its causes: it is thought that it had been found in the settling of the layer of clay into which the piles have been driven. Moreover, the phenomenon is continuous and periodic. It is enough to recall that the ancient monuments were built flush with the water, that it is only from the year 500 that buildings were placed on gradins, and the Piazza of St. Mark itself offers a curious example of this. The Campanile, which is the most ancient monument on it, was, before its fall, lower than it was intended to be by its builders, because of the fact that the pavement of the Piazza had been raised. In fact, under the modern pavement is found an earlier one; then, lower still, are found relics of the *opus spicatum* of the Middle Ages, such as we see it in the paintings of Gentile Bellini, and, finally, still farther down, we come to vestiges of Roman occupation and the level of beaten earth, upon which walked primitive man.

Signor Boni excels in archæological investigations. He has created a special method, of which I shall shortly probably take occasion to write to you, which has enabled him to reconstruct, in great part, the primitive history of the Roman Forum, by a system of vertical research and horizontal examination of successive layers of ground, of pavements, of substructures, more or less ancient, of historic stories [*étages*], in a word, and as the Piazza of St. Mark is really the Venitian Forum of Roman times, the excavations which he is going to carry out will probably give rise to discoveries of great historic importance.

Because of the subsidence an interesting problem presents itself. Ought the Tower of St. Mark, which it is desired to have rebuilt on the same spot — with the same architectural proportions — a perfect copy in fact, to be built to the same height from the present level of the Piazza, or still higher? for the Campanile has buried itself to the amount of 70 centimetres, so that it was by so much lower than when first erected. Of the five gradins which form its base, two and one-half had become buried beneath the level of the Piazza, and as it is now a question of historical restoration, it ought to be right to take account of the origin of the Campanile, and rebuild it to its original height. Objection has been made to Signor Boni that this heightening of the Campanile might disarrange the harmony of the lines of the Piazza, through the equivalent lowering of their lines, but it is only necessary to remember that 70 centimetres is no great portion of a tower nearly 100 metres high.

One thing Signor Boni absolutely refuses to do, and that is to rebuild the Campanile in any other spot. To do this would be to disarrange the harmony of the entire group of buildings on the Piazza, since the Campanile being the most ancient structure there, it is entirely natural that the architects of the other monuments must have taken it for their point of departure. "Any displacement," says Signor Boni, "would disturb the symmetry of the Piazza; and in making use of the word 'symmetry' I give it its Greek meaning, and not that which is directly attributed to it. Symmetry does not mean equality; the word rather signifies a harmony of the *ensemble* of elements that are not discordant, but merely unequal. The Acropolis for example, is composed of members that do not repeat one another, but that does not prevent its having perfect symmetry."

The new Campanile will differ from the old one only in certain details of construction, in its foundation, in its elevation, in the employment of resources of modern construction. Signor Boni is absolutely determined that the material employed shall guarantee a perfect stability. He will, therefore, watch over its choice. The old monument was composed, in great part, of old Roman material. There have been found amongst the ruins splendid specimens of brick of the first and second centuries, marked with the stamps of Nero, of Claudius, and of Antoninus Pius. There have also been found a score of bricks with unknown stamps which have revealed many things — such as the existence of Roman *figulinæ* (brick-yards) in the cities of the vanguard, which, on the slope of the Alps, the Latins built against the invasion of the barbarians; and also of the active life of the garrison of these cities, and several details of their domestic life. Several of these bricks still bear the imprint of the footmarks of animals who trampled on them while the clay was still green, and there are imprinted stamps of domestic animals such as goats, lambs and pigeons. Upon these bricks have been found traces of ancient Roman mortar, which, as is well known, was very strong; while the Venetians of the Middle Ages used a mortar composed of Istrian lime and a calcareous débris — a mortar, moreover, which did not set properly, as it absolutely lacked hydraulicity. In the reconstruction which is being planned with a view, particularly, to secure the greatest resistance to compression, it is almost certain that there will be found beds of clay which will yield bricks identical to those of Aquillia, which were indestructible. As to the mortar, it will be made from a mixture of Istrian lime and the famous pozzolana, which even resists dynamite. The foundations whose resistance is the chief consideration, will be reënforced, as I have said above, so that their powers of resistance will be doubled, and, finally, the soil will be consolidated by means of piles of huge dimensions.

As to the exact and integral reconstruction of the monument, it appears that Signor Boni has at his command all the necessary elements, the most exact drawings, from the piling up to the angel which used to crown the edifice. The reproduction, therefore, should be perfect. It will only be necessary to introduce certain modifications in the arrangement of the interior staircases, the hanging of the bells, and so on. The sole architectural modification will be the elevating of the whole by the 70 centimetres now buried beneath the pavement of the Piazza, and this will, at the same time, preserve historic fidelity and answer a technical purpose, because a granite socle can only consolidate the structure and protect its base from the saline emanations rising from the soil.

The Loggetta of Sansovino will also show itself once more. This graceful little structure had the misfortune to be backed against, or, as it were, hung against the Campanile. It will not be rebuilt in the same way. The Loggetta will be placed on the foundations of the Campanile — upon the same block — so that there will no longer be any cracks or movements to be feared. A quantity of fragments of statues from the Loggetta have been saved. Its historical restoration will therefore be easy. It is intended to restore it to its former function, that is to say, to serve as the entrance to the Campanile.

"In five years," Signor Boni says, "we shall hear again the 'Marangona'" — this is the name of the largest bell in the Campanile — and doubtless he will be able to keep his word.

As you see from these remarks, his plans have been very carefully studied, and we can count on his following out the execution of the work with the calm steadfastness and conscientious ability which distinguish him; but that which shows that Signor Boni is in true sympathy with his work is that he is in no way obsessed by the hysteria of the writers and artists who saw in the downfall of the Campanile di San Marco only a pretext for making a graceful flourish, and announcing to the whole world that their sensitive souls had been rent and wrung by the disaster, and that they had shed bitter tears over the ruins of the monument. A good deal might be said upon this hypocritical ranting, which has been only too favorably received by the newspapers, and at the inquests which were held over the fall of the tower. We will be content to present to the hearts of these too soulful artists the masculine figure of Signor Boni, who, without crocodile tears, or the aid of the hackney muse, is going to rebuild the Campanile, and who really is about the only man in Italy capable of accomplishing the task.

HONORÉ MEREU.

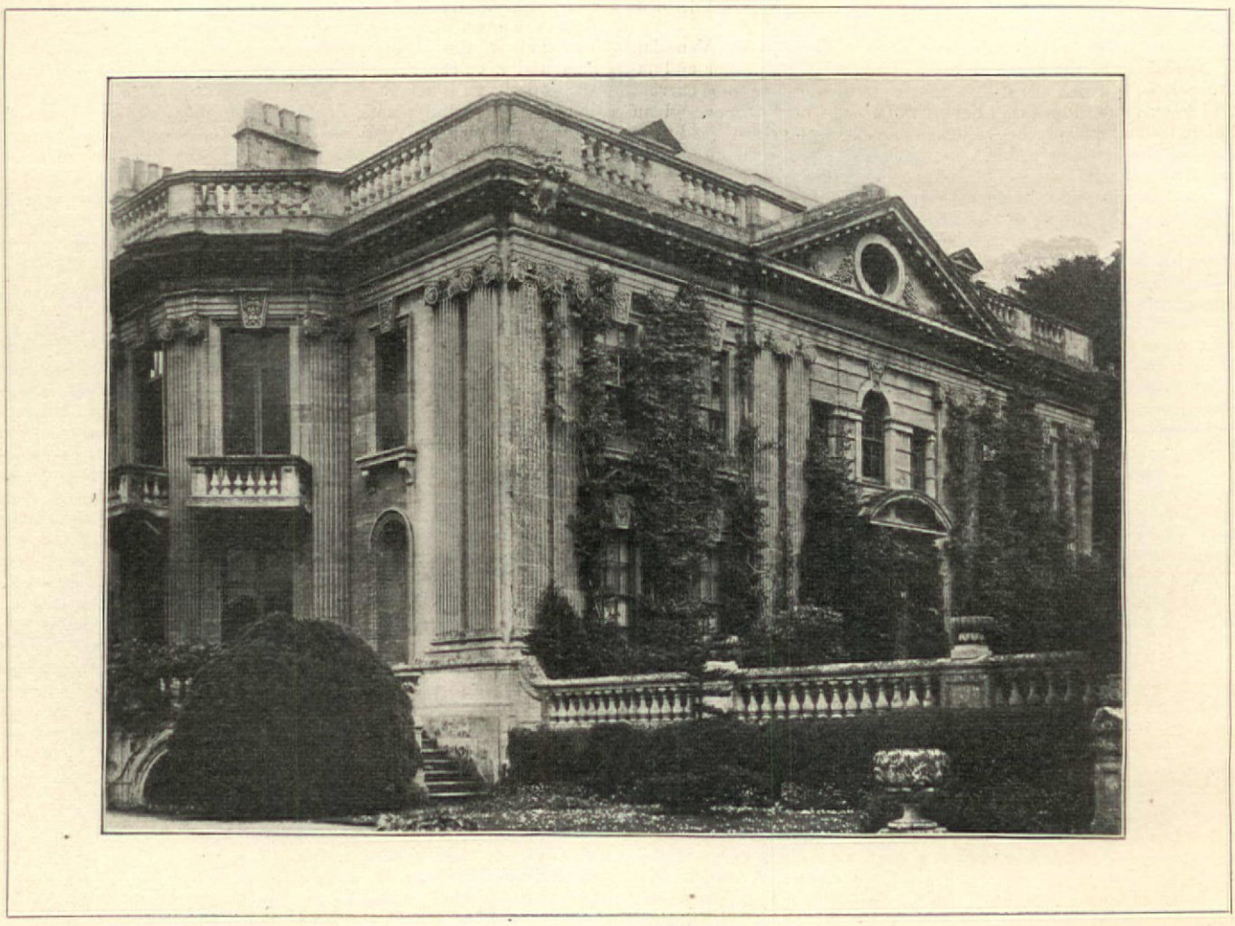
BOOKS AND PAPERS

THE first part of a very valuable book[1] has just appeared, "*The Eighteenth Century Architecture of Bath*" (England), by Mowbray A. Green, A. R. I. B. A. It is illustrated profusely by measured drawings, photographs, sketches and reproductions of old

[1] Published by G. Gregory, Argyle St., Bath, 1*s.* 6*d.*, in paper covers; 4 parts, and limited to 500 copies, numbered.

maps, and is a work which every architect interested in eighteenth-century domestic architecture will be glad to possess. Part I only takes us down to the first quarter of the eighteenth century when the elder Wood began his work of renovating the old city. Most of the houses were then a sort of transition from gabled Tudor frontages and mullioned windows to the Palladian style of the latter half of the century; and it is interesting to follow Mr. Green's illustrations showing this gradual adoption of Classic details. First of all, apparently, windows were altered, as we see large sash-windows take the place of casement-windows in the pointed gables; and then the gables disappear and we have broken pediments over the doors and windows, cornices and Classic doorways. Bath should be interesting to Americans, as its architecture must have been in some measure the cousin-german of the Old Colonial work. Looking through Mr. Green's book one sees details with which those cognizant of the Old Colonial architecture of the States are familiar. The luck of rebuilding a city which fell to the lot of the two Woods has rarely been experienced except in later times, under the last Imperial *régime* in France, when Baron Hausmann ruled lines across the map of Paris and swept away all buildings which came in the way of the new streets. Money was no object, as it was other people's! And apparently the elder Wood acted much in the same way. Landowners in Bath arranged for demolishing old buildings and putting up new ones, possibly with much too free a hand, for nothing or next to nothing remains in Bath of an earlier period except the Abbey church. And yet how benighted was the building-trade in those days. "In Wood's '*Description of Bath*' he makes the following cogent remarks on the working of Bath stone: 'My speaking of this House leads me to explain the Defects in the Management of the Mason's trade at *Bath*. Our Free Stone is beyond dispute a most excellent Building Material, as being Durable, Beautiful and Cheap: It has been generally worked in the Quarries upon the Hills round about the City by Men who stile themselves Free Masons, *i. e.* Masons, whose Province it is to work Free Stone, and from thence carried, ready wrought, to the several Places where it was to be used in Building; by which Means the sharp Edges and Corners of the Stones are generally broke. In this Condition the Free Stone work is usually set up by other Men, who call themselves Rough Masons, *i. e.* Masons whose Province it is to work the Refuse of the Free Stone or the common Wall Stones: and thus by dividing the Mason's Trade into two Branches, the Works in *Bath* lose that Neatness in the Joints between the Stones, and that Sharpness in the Edges of the Mouldings, which they ought to have: and which People accustomed to good Work in other Places, first look for here.' There is a great deal," continues Mr. Green, "to be said in favor of Wood's view of the matter, but of course, in his day it was impossible on account of the rough means of transit, to exercise such care in the use of the stone as at the present time. In addition to this, he had been accustomed to work executed in hard Yorkshire stone, which would preserve the sharpness to a much greater degree."

The book is unfortunately, of necessity, printed upon somewhat glazed paper, but as the four parts will consist of only about 200 pages, it will not be over weighty in spite of its numerous illustrations. It is the only work treating exclusively of the domestic architecture of Bath in detail and apart from the history of the city. All other works are more or less historical "guides."



Widcombe House, Bath, Eng.

AUSTRALIAN SOFT WOODS.

THE heavy timbers in which Australia is so rich have become famous for their exceptional hardness and durability, but comparatively little is known outside the Commonwealth of the numerous soft woods admirably adapted for the manufacture of furniture and for other industrial purposes. Such timbers are abundant in New South Wales, and are found principally in the immense brush forests of the coastal districts. Several of these timbers have a wood grained and marked most beautifully, and capable of receiving the highest polish, while others are fragrantly perfumed. Amongst the chief varieties of woods of this class may be mentioned the red-cedar, the beautiful wood of which is admirably adapted for the finer kinds of cabinet-makers' work. Some of the cedar-trees grow to immense size, as much as 2,500 cubic feet of valuable timber having been obtained from one tree. In addition to the cedar may be mentioned tulip-wood, yellow-wood, white-maple, myall, marble-wood, mock-orange, and many others. Besides their use for cabinet-making, many of the brush timbers are of great utility for the rougher kinds of carpentry, while some, both hard and soft woods, are admirably adapted for coach-builders' and coopers' work. The chief description of pine growing in New South Wales is the Moreton Bay white-pine, found in the coast districts as far south as the Bellinger. It is soft, light, and easily wrought, and suitable for all the interior woodwork of houses, as well as for cabinet-making. The red or black pine is extensively distributed over the Liverpool Plains, and in the Lachlan and Darling River districts, as well as around Berrima. It is beautifully marked in the grain, takes a fine polish, and has an agreeable fragrance. There are numerous other varieties of pine, but these resemble in their main features the trees already described. Australian deal is an excellent timber, and is obtained in very large scantling, the tree frequently reaching 120 feet in height. It is soft, close-grained, easily wrought, and remarkably free from knots. Its use, therefore, is extensive for cabinet-makers' work and

house-fittings. The New South Wales Government Statistician mentions several of the more useful of the soft and fancy woods of the State. They include the beech, which attains a height of 100 to 150 feet, with a diameter of 3 to 5 feet, giving a strong white, close-grained, and durable wood, easily worked, and greatly valued for decks of vessels, flooring, turnery, and furniture-making; the black bean, growing to a height of 120 to 130 feet, with a diameter of from 4 to 5 feet, with a handsome, close-grained, dark-colored, durable wood; the black-oak, used for bullock-yokes, tool-handles, shingles, etc.; and the black-wood, resembling walnut, and highly valued for making furniture. Another valuable timber is the rose-wood. It is strong-grained and durable, with a color resembling Spanish mahogany. Among other woods may be mentioned the silky-oak, which attains a height of 70 to 80 feet. The color is a light gray, beautifully crossed with silvery waves, and when polished the surface has a delicate lustre. Bedroom suites made from this wood possess a dainty appearance. Satin-wood is another useful timber, yellow in color. It is soft and silky to the touch, close-grained, and easily wrought. This wood is also suitable for cabinet-making, and is considered to be superior to the satin-wood used in the European and American furniture trade. When the system of forest conservation becomes more general in the State, the supplies of many of the timbers mentioned will become practically inexhaustible, and are certain to be in large demand for export purposes.

JOHN PLUMMER.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE RED SWAN INN, WARWICK, N. Y. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

THE COURTYARD: HOUSE OF E. ROLLINS MORSE, ESQ., NEWPORT, R. I. MR. OGDEN CODMAN, JR., ARCHITECT, NEW YORK, N. Y.

A COMPETITIVE DESIGN FOR THE CARNEGIE LIBRARY, NASHVILLE, TENN. MESSRS. FERRY & CLAS, ARCHITECTS, MILWAUKEE, WIS.

[The following named illustration may be found by reference to our advertising pages.]

DETAIL OF STAIRCASE, NASSAU HOUSE, BATH, ENG; — DOORWAY TO BEAU NASH'S HOUSE, BATH, ENG.

SEE "Books and Papers" elsewhere in this issue.

[Additional Illustrations in the International Edition.]

THE ROMAN CATHOLIC CATHEDRAL, WESTMINSTER, LONDON, ENG. MESSRS. JOS. F. BENTLEY & SONS, ARCHITECTS.

WE republish this week, from the *British Architect*, a plate taken from a large drawing, prepared under the direction of the late Mr. Bentley, which doubtless illustrates the exterior of the Cathedral from its most favorable aspect, and which is not liable to the defects that inevitably arise in photographic records. The drawing was prepared from the architect's scale-plans of the building, and corrected in detail from the work itself. It shows, moreover, the tympanum of the great entrance filled with mosaic after the cartoon prepared for the work.

The foundation-stone of the great church was laid on June 29, 1895, by Cardinal Vaughan. The total expenditure for work and material up to July 25, 1902, has been £162,871, but no cost of the Archbishop's home has been borne by the Cathedral Building Fund.

The Cathedral stands on a site of some 4 acres in Ashley Gardens, close to Victoria Station. It is entered by a fine porch, and the plan consists of a porch, a narthex, or vestibule, extending across the whole width of the Cathedral; a nave and two aisles, with eight side-chapels and transepts; a sanctuary, 4½ feet above the level of the nave, with the Blessed Sacrament and the Lady Chapel at the sides; beyond the sanctuary a raised choir, 13 feet above the nave, for the chanting of the Divine Office, with a crypt beneath it; a spacious gallery over the aisles and at the west end; and, behind the Blessed Sacrament Chapel, two vast sacristies and other rooms connected with them. The external dimensions are: Extreme length, 360 feet; width, 156 feet; height of nave, 117 feet; height of façade (not including the turrets), 101 feet; height of campanile, 273 feet; and to the top of the cross, 283 feet. Internally, the dimensions are: Length from the main entrance to the sanctuary, 232 feet; depth of the sanctuary, 62 feet; and of the raised choir beyond it, 48 feet — making the total internal length 342 feet; width of nave, 60 feet; width across nave and aisles, 98 feet; across nave and aisles and side-chapels, 148 feet; height of the main arches of the nave, 90 feet; and of the three domes of the nave, 112 feet. The chief materials are very hard brick and stone, set in cement-mortar. The foundations, of most solid construction, rest everywhere upon a bed of concrete which varies from 4 to 10 feet or more in depth. The external walls, to the height of 8 feet from the ground, are of granite; and the structure above is of red bricks, with a very large amount of decorative work in Portland-stone.

Internally the appearance of the Cathedral is exceedingly impressive, with the full view of its 342 feet of length; its vast nave, much wider and higher than any nave in England; the twelve lower arches on each side of the nave, supporting the stately gallery; above each two of these arches a lofty arch of 73 feet in height; above each two of the latter a still loftier arch of 90 feet; and, rising above the highest arches, the three domes of the nave. Besides the massive piers, there are (in the nave, aisles and transepts) twenty-eight columns of marble, with a marble front to the gallery; and the lower walls, and the piers to the height of about 38 feet are being covered with marble. The whole upper part of the piers and walls, the vaults and the concrete domes will be decorated with mosaicwork illustrating the history of the Roman Catholic Church.

For the flooring Mr. Bentley had prepared a design in marble, with squares of cipollino, in which were set fishes of a slightly red-tinted marble swimming in the rippled waves of the sea. An allusion to the idea of the church being a ship bearing her burden safely over the sea of life. This floor would have cost some £15,000, and, moreover, would have been of doubtful quality for a vast crowd of kneeling worshippers, who are liable to effect of chill even when such a floor is covered with matting. In Vienna the marble floor of the Cathedral is overlaid with boards in the winter, in Spain the floors are covered with mats, and in St. Peter's, in Rome, a plank is put down, on which the deacons stand to sing the Passion in Holy Week. It has been decided for the present to use a wood-block flooring, which is warm, noiseless and comfortable. The narthex, however, will contain Mr. Bentley's marble flooring, and the piers and columns will be bound together by a marble framing; so that the wood-block will appear as a canvas enclosed in its frame.

The acoustic properties of the Cathedral have turned out to be unexpectedly excellent. A speaker standing in the apse has been heard distinctly at the entrance-door of the Cathedral — the nave being empty. What will be the effect upon sound of a large audience filling the nave is one of the results looked forward to from the performance of music that will be given on the 11th of June. The science of acoustics appears still to be in an extremely backward condition, for no architect seems to know what his church will do with the sounds of the human voice produced in it. Mr. Bentley *hoped* that the preacher would be heard distinctly; but not even he could be sure until the experiment had been made.

The construction of the domes should be noted. No iron whatever is used in their construction. They are built of concrete of 4 parts broken brick to one of Portland-cement mixed with the least possible quantity of water. The concrete was prepared on a stage round each dome and thrown fresh on to the boarded centre, sanded to prevent its adhesion, in ranges varying from 3 to 5 feet deep, and screened on the upper surface to a graduated thickness so as to ensure an absolute uniformity in longitudinal and latitudinal section. No cement was used until it had been 13 weeks on the site and periodically turned over.

HOUSE OF E. ROLLINS MORSE, ESQ., NEWPORT, R. I. MR. OGDEN CODMAN, JR., ARCHITECT, NEW YORK, N. Y.

ENTRANCE TO ESTATE OF E. ROLLINS MORSE, ESQ., NEWPORT, R. I.

THE ROOD-SCREEN: ALL SAINTS', GREAT NECK, LONG ISLAND, N. Y. MESSRS. CRAM, GOODHUE & FERGUSON, BOSTON, MASS., AND MR. SILAS MCBEE, ASSOCIATED ARCHITECTS.

NOTES AND CLIPPINGS

THE LION OF LUCERNE. — A great deal of anxiety is felt in the country through the discovery that one of Switzerland's chief historical monuments — the Lion of Lucerne — is threatened with destruction. The Lion, which was chiselled from the solid sandstone-rock by the Swiss artist Aborn, in 1792, commemorates the massacre of the Swiss Guard during the French Revolution, and, as a work of art, is unique. It is situated in rather damp surroundings, above a pool in the glacier-garden at Lucerne, and the water has trickled through the sandstone, which threatens to crumble, and thus destroy the statue. An expert has been examining the rock, and by his advice it has been decided to cut away the surrounding rock and isolate the Lion. — *Geneva Correspondence London Chronicle.*

[Aborn may have cut the stone, but the Lion was modelled in 1821 by Thorwaldsen; the Swiss Guard was massacred in 1792, and the memorial was not a ready-made one. — EDS.]

American Bridges, beautiful and ugly. — We have only to look at the bridges of Paris, of London, of Berlin, to see that good bridges are the rule rather than the exception in European cities, and that eminent beauty and monumental character, as illustrated by some of the newest structures, are compatible with the latest achievements of engineering in metallic construction. On the other hand, when we look at our American cities, we shall see good bridges a rare exception. New York, for example, has but one good bridge of note, in the strict acceptance of the term — Washington Bridge over the Harlem. The High Bridge, close by, is part of an aqueduct. Chicago, whose river gives it a superabundance of bridges, outside of its parks has not a single one worthy of the name. Boston is another city of bridges, but most of these are inexpressibly mean affairs. In the parks, to be sure, Boston has many bridges of striking beauty, representing a remarkable variety in design. One — the Longwood Avenue Bridge, spanning the idyllic stream of the Riverway with a noble great arch — is for ordinary traffic rather than for park purposes. Some of the most deplorable of Boston's bridges cross the great channel which the railway-tracks cut through the heart of the city. Of these, the Dartmouth Street Bridge in particular, hard by Copley Square and the Public Library and against the rich façade of the Back Bay railway-station, is so aggressively offensive, with its steel trusswork of an excruciatingly distorted shape, that any expense would be justifiable to secure its replacement with something unobtrusively worthy of the site. But the tide in Boston appears at last to have turned toward the construction of good bridges. A handsome new bridge for combined parkway and ordinary traffic across the Neponset is one token of this tendency, but the most significant instance is that of the great new bridge to Cambridge under construction across the Charles River. Particular pains have been taken to give a monumental character to this bridge, which has received, prospectively, the name of the most beautiful in the United States. — *Sylvester Baxter on "Art in Public Works" in the October Century.*

The Silver-leaf Poplar. — The immense demand for paper and the great quantity of wood used in making pulp call for the replanting, with some hardy, quick-maturing tree, of the acres denuded by this industry. A future crop of wood must be assured. The silver poplar, or abele, an importation from Europe, now become wild in this country, will answer this purpose well. It is found in every great city and is almost the only shade-tree that will survive the numerous vicissitudes of city life. The suckering is a nuisance in the city, but helpful for planting. The tree frequently surrounds itself with several thousand sprouts suitable for forest planting or it may be grown from cuttings of the branches or of the roots. The silver-leaved poplar is of rapid growth under favorable conditions. It will flourish upon the mountain-slopes of the Eastern States, increasing from three-fourths to one inch in diameter yearly. The wood is white and similar to that of the cotton-wood. There are many places where it would serve a good purpose for lumber. In 20 years there may be grown from 50,000 to 60,000 feet b. m. of lumber per acre from the abele — estimating 170 trees per acre, 20 inches in diameter and 20 foot length of trunk, which it is capable of attaining. Or considering it for pulp-production, there would be 6,500 to 7,000 cubic feet of wood per acre. — *Boston Transcript.*

An old Brown Cedar. — Charles E. Bessey, of the University of Nebraska, writes to *Science* of a cedar which he asserts to be over 1,000 years old, as follows: — "In the Garden of the Gods, near Pike's Peak, Colorado, there are many large specimens of the brown cedar, *Juniperus monosperma* (Engelm.), Sargent, and in a recent visit to that place it occurred to the writer that these trees must be very old. On the 13th of August he was fortunate enough to find the stump of a recently cut tree, on which it was easy to distinguish the annual growth-rings. These were counted for a section of the trunk, care being taken to select a portion in which the rings were of average thickness, and on this basis the number for the whole stump was calculated. In this way it was found that this particular tree was between 800 and 1,000 years old. In other words, this tree was a seedling some time between the years 900 and 1100 A. D."

The Archæological Value of old Cottages. — Some of the most precious finds that have ever fallen to the lot of the antiquary and collector have been in connection with small cottage-houses in the country, the sites of which have been near old ruined castles, abbeys and mansions. As such ancient buildings fell into decay in times long past, the materials of which they were composed and the very furniture and fittings within them were utilized by humble people for the construction of dwellings, and in this way relics of the past that are well-nigh priceless have been found in the walls and woodwork of laborers' cottages. Some of the most beautiful colored-glass of a very early period known to English collectors was found in a cottage near Ripon, in Yorkshire, and the very leaden frames in which the glass was embedded were unique and of great value to connoisseurs. Both glass and leaden frames are supposed to have come from Fountains Abbey, near to the cottage in question. In another case, not far from Pontefract, the stones of a humble cottage were found to have upon them many names rudely carved. As the cottage was itself a tumbled-down affair, it was levelled to the ground by the owner, and antiquaries then determined that the stones, with the inscriptions upon them, had come from an ancient castle. The names were those of Cromwellian and other soldiers for the most part, but some of the carved names were evidently those of prisoners of a much earlier period. Some of the most beautiful specimens extant of ancient woodwork have come from ancient cottages, but in all cases the latter have stood at some point near an ancient castle or abbey. — *London Tit-Bits.*

A Cedar-forest whittled down. — The cedar-factory at Greenville, Ala., is no more. For more than ten years it has been one of the most important industries in the South. It was built by some Richmond, Va., people, who found a little bucket-factory there and turned it into a big concern for making the little slats out of which lead-pencils are constructed. They built their own railroad out to Cedar Creek, where the timber grew, and gave employment to some 700 men, women and children. Now the cedar-timber is all gone, made into pencils, and ultimately whittled away by jack-knives of 70,000,000 people who have been sharpening pencils through the last decade. The timber being exhausted, the factory moves on to Mobile, where fresh supplies can be floated down the rivers and creeks from the interior. — *Boston Transcript.*

Sur le Tapis. — "On the carpet," again. Without any wish to charge so brilliant an author with the offences of her times we are compelled to observe, in the same book, that absurd carpet spread once more for the discussion of affairs. "Le tapis," on which things have been talked over in French literature, is — need we say? — not a carpet, but a table-cover; in fact, the green-baize table-cover of diplomatic convocation. On that are laid the papers, the protocols. A tapis is a carpet only when it covers the floor. Paper-hangings are called *tapisserie*, but even the English haste to burlesque (with an eye to "quaintness") the idioms of the stranger has not led our authors to speak of carpeting French walls. Would that "jumps to the eyes" and "it goes without saying" might be suppressed forever in English; but, at any rate, they are correct translations; whereas, "on the carpet" is not. — *London Chronicle.*

Experiments on Steel in Concrete. — By recent experiments to discover whether steel imbedded in concrete suffers any injurious changes, conducted by M. Breuillié, and described by him in the *Annales des Ponts et Chaussées*, it has been proved that steel does undergo certain changes. The paper on the subject shows that a salt is formed by the action of the cement on iron, also that this salt is dissolved by the water which penetrates into the concrete-steel. According to this action of the cement on the steel, it has been proved by experiment on ten 2″ x 2″ plates, that the weight of steel must undergo a change; it will be more or less "according as the newly-formed body adheres to the steel or not." An analysis of the plates was made, and an increase of weight was found, due to the formation of a silicate of iron. The tables given in the article of Mr. Breuillié indicate a regular increase in the weight. The author says: "If a soluble salt had formed, the plates taken out from the mortar should lose weight under the action of water. Nos. 46 to 50 were twice put in constantly renewed water, and they lost part of their weight. After 6 hours the loss of weight was on an average 2 milligrammes; after a second immersion of 7 hours the loss was 2.2 milligrammes. The salt which is formed at the contact of steel to cement seems to have an effect on the adhesion of the two bodies. To discover this point the author decided to find out whether the adhesion takes place on the setting of the cement, or whether it increases with age, as the salts do. The experiments made on thirty plates $1\frac{3}{4}'' \times 2\frac{3}{4}''$, placed on a horizontal surface of a concrete block, and then torn off after 2 to 5 days' intervals, showed that the adhesive increased uniformly, and cracked after 30 days. The above experiments convinced the author that (*a*) the cement attacked the iron; (*b*) water dissolved the composition which formed at the contact of the two materials; (*c*) the adhesion of the steel to the cement disappeared when water passed through the concrete-steel for a certain time; (*d*) the weight of the iron salts which adhere to the steel, and the normal adhesion between the steel and concrete increased with the time. Up to this time it has been thought that steelwork imbedded in concrete is not injuriously affected. These experiments certainly tend to disprove the assumption.

Wedgwood and its Maker. — What a debt of gratitude the world owes to the energy, enterprise, and rare artistic taste of Josiah Wedgwood, who more than any other made the sculptor's art familiar to every household — made it possible, as Prime says, for workmen in English shops and laborers in the field to use for buttons and ornaments gems of the glyptic art of the best ancient artists. It was a fortunate inspiration when Wedgwood overcame his modesty in regard to his achievement and presented in 1762 a candle and breakfast service of his cream-colored ware to Queen Charlotte, who was so enthusiastic over the soft ivory tint of the paste, the delicacy of decoration, and beauty of shape that she ever after gave him her patronage and bestowed the name of "Queen's Ware" upon this rarely beautiful product of Etruria. The recognition ensured his popularity and success, enabling him to carry out many plans which he had before been unable, financially, to mature. One of his happiest inspirations was the engagement of Flaxman, the portrait-medallions of the factory being chiefly cast from the latter's models, also the classical cameo-like decorations of white porcelain biscuit which adorned the early Wedgwood. Meantime, says the *Delineator*, such is the reward of genius — this second Phidias worked for about a guinea a day. Wedgwood had much to do, both directly and indirectly, with the "porcelain mania." His gift to Charlotte resulted in a royal penchant for objects of virtu, imitated by her subjects and inherited by her daughters, particularly the Princess Elizabeth, who is chronicled as begging her mother to go to Strawberry Hill, where she declares she spent a morning after her own heart among its china and other treasures. Histories may stand unopened upon the library-shelves, but bring out the "Landing" pitcher with its rich blue, and the gallant Lafayette seems to step into the group gathered around it. "I caught a glimpse of him as he passed down Genesee Street," says one. "My grandfather shook his hand," says another. "My great-great-grandfather fought by his side," proudly declares a third, recalling his bravery, his affectionate remembrance of those who shared danger with him as exemplified in his kneeling to kiss the curb above a comrade's grave, with the touching remark: "Ici repose un cœur noble." — *Philadelphia Press.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, OCTOBER 25, 1902 No. 1400

CONTENTS.

SUMMARY: —
Report on the Anthracite-coal Strike by Carroll D. Wright, Commissioner of Labor. — Investigation into the Corrosion of Steel-frame Construction by the Insurance Egineering Experiment Station. — Structural Steel surrounded by Masonry. 25
THE AMERICAN VIGNOLA. — X. 27
URALITE. 29
THE FABRIC FUND OF WESTMINSTER ABBEY. 29
ZIMBABWE RUINS. 30
IRON AND STEEL SLAG. 31
BOOKS AND PAPERS. 31
ILLUSTRATIONS: —
Circular Greek Temple, Tiverton, R. I.—Nos. 13 and 15 Beacon St, Boston, Mass. — House for Arthur W. Pope, Esq. — Dining-room for Oliver W. Mink, Esq., Manchester-by-the-Sea, Mass. — Superposition and Intercolumniation.
A View in Charleston, S. C.
Additional: Lawn Front: House of Edward J. Berwind, Esq., Newport, R. I. — House of William H. Oakes, Esq., Waban, Mass. — Choir Details: All Saints', Great Neck, Long Island, N. Y. — Details of Rood-screen: All Saints', Great Neck, Long Island, N. Y. — Details of Reredos: All Saints', Great Neck, Long Island, N. Y. — Altar and Reredos: All Saints', Great Neck, Long Island, N. Y. 31
NOTES AND CLIPPINGS. 32

ONE of the most interesting public documents ever issued is Mr. Carroll D. Wright's report on the anthracite-coal strike, which forms the most important portion of the November Bulletin of the Department of Labor. In this admirable paper Mr. Wright appears at his very best, as an experienced and considerate official, skilful in ascertaining the truth, and ready to do justice to both sides. As those who have read the newspaper accounts of the statements of both sides will readily infer, the trouble is, apparently, due, in great part, to prejudice and misunderstanding, on the part of the operators as well as of the miners. As Mr. Wright shows, the dissatisfaction of the miners is to be attributed, in a considerable degree, to petty injustices and oppressions on the part of foremen and overseers, and, even of these, many are unintentional, and are to be attributed to the ignorance, on the part of the miners and the foremen, of each other's language. Overseers of this class are notoriously disposed to be unreasonable and tyrannical, and any one who has seen an Irish foreman bully a squad of Italian laborers can easily imagine that a gang of Italian, Hungarian and Russian miners, incapable of understanding their overseer, or of making themselves understood by him, would soon lay up a long list of grudges against a foreman of the ordinary type. In the mines, the case is made worse by the fact that deduction is made from the miners' wages for stone in the coal that they get out; and, as this deduction is, apparently, left wholly to the judgment of the overseer, it is, naturally, impossible to avoid some appearance, at least, of oppression and unfairness. If the operators were willing to interest themselves in the working of their own mines, and show themselves ready to listen to complaints, and to remedy injustice, Mr. Wright thinks that they would get loyal and faithful service in return; but they choose, apparently, to take the attitude that their men are their slaves, and talk about "discipline," exactly as a Southern planter, before the Civil War, would have discussed the problem of keeping unruly negroes in subjection; while, unlike the Southern negroes, whom their master was obliged to feed and clothe at all times, the anthracite miners are liable at any time to be turned adrift, by the closing of the mine, without any explanation, and, so far as they can tell, simply at the caprice of the operators.

IT is not surprising that this method of carrying on the business of anthracite mining should have brought about a state of things in which, as Colonel Wright says, "suspicion lurks in the minds of every one, and distrust in every action on either side"; and it is obvious that the operators, as the more intelligent class, are chiefly to blame for this. Under such circumstances, the idea of organizing the miners was brought forward, and here, again, a worse misunderstanding than ever arose. To the more sensible miners, and to a great many intelligent persons who, although not engaged in the business, were familiar with the conditions, it seemed as if an organization of this sort would enable the operators and their men to make definite agreements in regard to disputed points, such as the percentage to be deducted for rock, the standard size of car to be loaded by the men, and other matters, about which there was constant, and not entirely unreasonable, dissatisfaction; and it was thought probable that such an organization would be an effective means of keeping in order the ignorant foreign miners, who have no idea of the meaning of a contract, and rebel against the control of the foremen, whom they regard as their natural enemies, but whose loyalty to their fellows, which is a strong feeling among them, would lead them to obey the mandates of their own organization. There is a good deal to be said in favor of this view, but the operators jumped at the conclusion that an organization of this kind would destroy discipline; that its agreements would not be respected, and that it would be managed by the worst elements among the men. It is possible that all these results might follow the association of the anthracite miners, but it is, to say the least, not proved that they would do so, and the miners, who seem to have had a high ideal of their proposed organization, conceived the notion, which, from their point-of-view, was as reasonable as that of the operators, that the latter did not wish to make any agreement with the men, for fear of limiting the caprice and tyranny which the men attributed to them. This was exactly the state of things which a little courtesy and fairness might have brought to an amicable conclusion, and the operators are certainly to blame for not being willing to show these virtues. According to Colonel Wright, the conditions which the men ask for are not unreasonable. The operators say that if the demand of the miners for increased pay is granted, the cost of anthracite coal to the public will be increased sixty cents a ton. Fortunately, the public is quite aware that the price of coal is regulated, not by the wages paid to miners, but by what those who want the coal are willing to pay for it; and, as a matter of fact, Colonel Wright says that what the miners want is not so much an increase in their wages for the time that they work as relief from that curse of American industry, enforced idleness. He says, no doubt with reason, that "if the men could be sure of steady work, or fairly steady work, they could well afford, perhaps, to take less wages, or even to continue on the present basis of payment"; and it is understood that many of the men take this view. It is hardly necessary to point out that an increase in the number of days during which the men work would, naturally, result in an increase in the output of coal, and, presumably, in a reduction of the price; so that the interest of the public accords in this respect with that of the miners. Even the operators need not, it would seem, view this contingency with alarm. As they say, the wages paid to the miners for getting out coal form a small part of its cost, the rest being made up of interest payments, maintenance of machinery, expense of pumping, salaries of overseers and officials, and many similar items, which accumulate just as rapidly when the mine is worked six days in the week as when it is worked only four; and the obvious inference is that if the miners were employed continuously, instead of intermittently, the cost per ton of the coal produced would be much less that it is now, and the operators could, with profit, sell it to the public at a lower price, at the same time that they improved the condition of their men. All these points might properly, and with advantage, be investigated by an impartial commission; and, while there is, undoubtedly, much truth in what the operators say of the folly and tyranny of the unions, it may be presumed that such a commission would appreciate unreasonableness on the part of the miners, as well as on that of the operators.

THE Insurance Engineering Experiment Station has issued a Report, Number Four of its series, on the Corrosion of Steel Frames of Buildings, which is the most important contribution to the science of building which has appeared for many years. We need not say that, although many millions of dollars are expended upon steel-frame construction every year, no one has yet been able to give convincing proofs that buildings of this construction would last through more than one generation; and the warning of a very distinguished engineer, that, judging from his experience, few of them would reach their twentieth birthday, has never yet been met with anything better than mere assertion, unsupported by rational evidence. Under these circumstances, the Experiment Station undertook the task, not of testing steel frames under conditions exactly

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

similar to those to which they would be subjected in actual buildings, for the obvious reason that such a test would require several years' observation, but of imbedding structural steel in masonry, similar to that used in this system of construction, and exposing it to the action of moisture and carbonic acid in a more energetic form than that in which they present themselves in an ordinary atmosphere. As it is generally admitted that carbonic acid and a moist atmosphere are the active agents in corroding steel, the problem resolved itself into applying these agents in a concentrated form, so that their effect would be visible within the few weeks which could be devoted to the experiment; and, for this purpose, mixtures of steam and air, air and carbonic acid, and steam with carbonic acid and air were employed.

THE steel to be tested was in the form of expanded-metal lathing, steel rods, and sheet steel. In order to avoid error in consequence of spots of rust on the metal, which, in the opinion of many engineers, continue to increase under a covering which would efficiently protect clean metal, all the pieces of steel used were first scoured, then "pickled" in hot dilute sulphuric acid; after which they were dipped in hot milk of lime, to neutralize the acid, and the lime finally removed with a wire brush. This treatment left the metal perfectly free from rust. The pieces were then imbedded in concretes of various kinds, made with Alpha and Lehigh Portland-cement, mixed with sand, broken stone or cinders in different proportions. The concretes were formed into blocks, or briquettes, each briquette with a piece of metal buried in it; and in all cases the concreting materials were mixed dry, again mixed after adding water, and thoroughly tamped. Two briquettes were made of each mixture. In all, several hundred briquettes were made, and were exposed to different artificial atmospheres, as well as to the ordinary air of the laboratory; and, besides the briquettes, pieces of unprotected steel were also exposed. After three weeks, the briquettes were cut open, and the imbedded metal carefully examined. In all cases, the unprotected metal was found so badly corroded as to be "more rust than steel." Of the protected metal, that which had been buried in neat Portland-cement resisted the trial best, every specimen, whatever the atmosphere to which it had been exposed, being taken from the briquette as bright as when it was put in. Of the other specimens, which had been buried in concrete of some sort, we are told that "hardly one had escaped serious corrosion," and it was found that "the location of the rust spot was invariably coincident with either a void in the concrete or a badly rusted cinder." In cases where the concrete was porous, the steel was "spotted with alternate bright and badly rusted areas, each clearly defined"; and it is interesting to learn that the specimens least affected, after those made with neat cement, were those in which the concrete had been mixed very wet, so that the almost liquid cement had splashed over the steel like paint, protecting the portions which it covered. Some subsequent experiments, suggested by this observation, showed that, by using finely ground cinders, concrete made even with two parts cinder to one part of Portland-cement could be so applied, presumably by mixing it very soft, as to protect the steel, provided there were no crevices or perceptible voids.

EXAMINATION of some specimens, brought in from outside, of expanded metal embedded in concrete, showed that wherever the concrete was cracked, the steel began to rust, even though the cracks were very fine, indicating that the protecting cement, to be of service, must be in contact with the metal, a separation, even of a few one-hundredths of an inch, making it useless. In connection with this, Professor Norton, the author of the deeply-interesting report before us, says that he had recently occasion to examine some Z-bar columns, which were exposed in altering a metal-framed building five years old. The columns had been painted, and were simply built into the brickwork. The columns showed evidence of having been rusty when painted; and the moisture circulating between the brickwork and the metal had penetrated the paint, and caused the rust to increase, so as to split off the paint. It is probable that, if the steel had been perfectly clean when it was painted, the paint would have protected it for much more than five years. How long it would preserve it no one can say; but Professor Norton points out that, if the paint should disintegrate and disappear, it would leave a void next the metal, "the worst possible condition." He therefore much prefers a thorough wash of cement, applied directly to the clean steel, to any paint; but he says that "if, as is often the case, the choice is between paint and rust which accumulates during construction, the paint is to be preferred." The conclusions which Professor Norton draws from these experiments are that "neat Portland-cement, even in thin layers, is an effective preventive of rusting"; that "concretes, to be effective in preventing rust, must be dense, and without voids or cracks"; and "should be mixed quite wet when applied to the metal"; that "the corrosion found in cinder concrete is mainly due to the iron oxide, or rust, in the cinders, and not to the sulphur"; that "cinder concrete, if free from voids, and well rammed when wet, is about as effective as stone concrete in protecting steel"; and that "it is of the utmost importance that the steel be clean when bedded in concrete. Scraping, pickling, a sand-blast and lime should be used, if necessary, to have the metal clean when built into a wall."

WE have quoted more freely, perhaps, than we ought from a paper which is the property of the Insurance Engineering Experiment Station, but its extreme importance, and the urgent need of placing its conclusions before the profession at the earliest possible moment, will, we hope, be received as a sufficient apology. Meanwhile, as the Experiment Station invites suggestions from architects in regard to these matters, we would like to observe that as anything like pickling is out of the question with structural members, not only on account of the impracticability of dipping ten-ton girders, or thirty-foot columns, in hot sulphuric acid, but, still more, on account of the certainty that some of the acid would creep in between the plates, or under the rivets, out of reach of a lime wash, and there cause destructive corrosion, those who have every day to write specifications for the treatment of structural steel would like very much to know of some more practicable method of securing an approximately similar result. Professor Norton advises, besides pickling, scraping and sand-blast cleaning. The sand-blast would not be much easier of application than the pickling; but scraping is not difficult; or, as in our own practice, the steel can be cleaned quite effectually with a stiff wire brush. With either scraping or the wire brush there will still, however, be left traces of rust, particularly in the joints, and it seems possible that a thin alkaline wash might render them harmless, without involving the difficulty and danger of acid pickling. The milk of lime, which is only feebly alkaline, and is too thick to penetrate the crevices where rust would be likely to hide, could hardly be depended upon for this purpose, but it seems possible that a dilute solution of silicate of soda, followed by a lime wash, might be effective, and such an application would be quite within the capacity of the ordinary iron shop. As architects cannot often make chemical investigations for themselves, we hope that the Experiment Station may find disposition and opportunity to study this development of the subject; and the practice of the old New York builders, who, in the days when structural steel was left exposed, always whitewashed their "Cooper beams," or their "Harper girders," before painting them white, to prevent staining from the corrosive action of white lead on the iron, may, possibly, suggest some alkaline application which could be put on at the rolling-mill, before the painting which is necessary to prevent rusting in transportation and from storage in open yards, and which would, after the paint was scraped off with a wire brush, leave a clean surface, or, if the paint should not be scraped off, might resist even the action of moisture from masonry in contact with the paint.

ANOTHER point which the Experiment Station might study with great advantage is the behavior of structural steel surrounded by masonry other than concrete. The only example of this sort which Professor Norton refers to is the rather alarming one of the Z-bar column built, five years before, into brickwork, which had rusted so much as to throw off the paint. As, in practice, the most important members in a steel frame are surrounded by brickwork or stonework, not by concrete, the question of protecting them in that situation is a most urgent one. We may say that, in our own practice, all vertical members surrounded by brick or stone masonry are grouted every foot in height, as the brickwork is carried up around them, with liquid cement; and some architects accomplish substantially the same result by plastering the vertical members before building up the masonry around them; but these precautions are not usual. Judging from Professor Norton's experiments, they seem to be desirable, but it would be interesting and important to know how effective they are in preventing corrosion, and whether there is any better way of protecting such members.

THE AMERICAN VIGNOLA.[1]—X.

PART I.—THE FIVE ORDERS.

INTERCOLUMNIATION, OR THE SPACING OF COLUMNS.

THE space between two columns, measured just above their bases, is called an *Intercolumniation*. It is one Diameter less than their distance apart on centres, or on edges.

Columns are said to be *Coupled*, or to have a *Pycnostyle*, *Systyle*, *Diastyle*, or *Areostyle* Intercolumniation, according as they are set close together, or are one, two, three or four diameters apart, as nearly as may be, i. e., about one, two, three, four or five Diameters on centres. The Systyle and Diastyle are the most usual, with an Intercolumniation of two or of three Diameters.

But Coupled columns cannot be nearer than $1\frac{1}{3}$ D. on centres, instead of 1 D., on account of the projection of their bases, and in the Ionic, Corinthian and Composite Orders, not nearer than $1\frac{1}{2}$ D., on account of the projection of their Capitals. The Intercolumniation of Coupled Columns is accordingly $\frac{1}{3}$ D., or $\frac{1}{2}$ D., or even a little more, to prevent the Bases or Caps from actually touching.

So also the Pycnostyle Intercolumniation is made $1\frac{1}{4}$ D., instead of 1 D. (i. e., $2\frac{1}{4}$ D. o. c., instead of 2), to avoid crowding. The ancients thought that even the Systyle columns with an Intercolumniation of two Diameters, came too near together, and preferred what they called the *Eustyle* Intercolumniation, of $2\frac{1}{2}$ Diameters (or $3\frac{1}{2}$ D. o. c. in place of 3 D.). But the moderns prefer to make the Eustyle Intercolumniation $2\frac{1}{3}$ D. (setting the columns $3\frac{1}{3}$ D. o. c.), as this brings every Column in Ionic and Corinthian colonnades exactly under a Dentil, and every alternate one just under a Modillion, the Dentils being $\frac{1}{6}$ D. o. c. and the Modillions $\frac{2}{3}$ D.

The wider Intercolumniations are preferable, obviously, when the columns are small, since otherwise it might be difficult to pass between them, and the Systyle, or even the Pycnostyle, when the columns are very large, since otherwise it might be difficult to find stone architraves long enough to span the interval. But the ancients used Tuscan Columns chiefly with wooden architraves, setting them as much as seven Diameters apart, which is called the *Tuscan Intercolumniation*, and which makes the space between the columns about square. In modern times also, an arrangement of coupled columns has been employed, called *Areosystyle*, the columns being set half a Diameter apart, and the space between the pairs of columns made $3\frac{1}{2}$ Diameters. This is greater than the Diastyle Intercolumniation and less than the Areostyle by half a Diameter. From the axis of one pair of columns to that of the next pair the distance is six Diameters. If in a Systyle Colonnade, with the columns three Diameters on centres, the alternate columns are moved along till they nearly touch the intervening ones, the result is an Areosystyle Colonnade. This was first used in the Eastern Colonnade of the Louvre (Fig. 151).

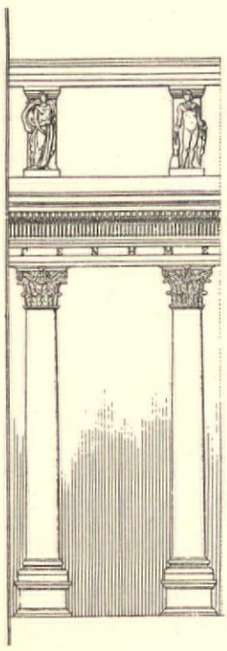


Fig. 150.

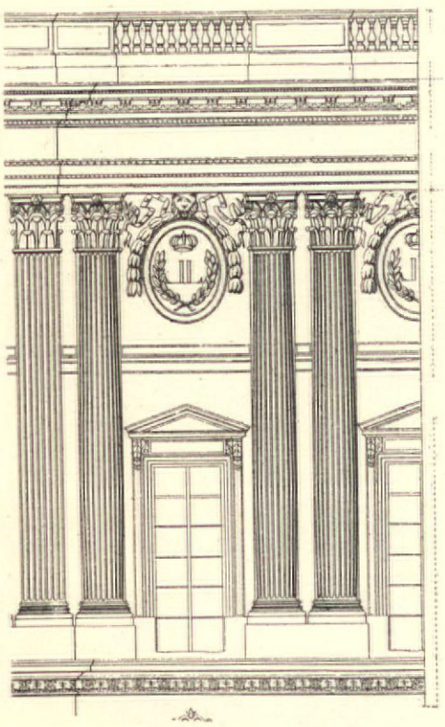


Fig. 151.
Colonnade of the Louvre.

In actual practice these rules for Intercolumniation are seldom exactly followed.

DORIC INTERCOLUMNIATIONS.

In the Doric Order, since the Columns come exactly under the Triglyphs and the Triglyphs are $1\frac{1}{4}$ D. o. c., as on edges (the width of the Triglyph being $\frac{1}{2}$ D. and that of the Metopes $\frac{3}{4}$ D.), the distance of the Columns on centres must needs be a multiple of $1\frac{1}{4}$ D.

This makes the coupling of Doric Columns difficult, since, even if the Bases touch, the distance between axes is still $1\frac{1}{3}$ D., which is more than that of the Triglyphs by $\frac{1}{12}$ D. This slight discrepancy can, however, be got over by making each Base a trifle narrower, or the Triglyphs and Metopes a trifle wider, or by putting the Columns *not* exactly under the Triglyphs, or by employing all these devices at once.

If the Columns are set under alternate Triglyphs so that there is one Triglyph over the intervening space, their distance apart o. c. is $2\frac{1}{2}$ D. The Intercolumniation is then $1\frac{1}{2}$ D., and is said to be *Monotriglyph*. This is the most common arrangement. But if the scale is small, it is usual, at least at the principal entrance of a building, to have two Triglyphs over the opening, the Columns being $3\frac{3}{4}$ D. on centres. The Intercolumniation is then $2\frac{3}{4}$ D., and is called *Ditriglyph*. Still wider spacing is employed when the Architraves are of wood.

When two, four, six, eight, ten or

[1] Continued from No. 1394, page 85.

twelve Columns are used, in a Colonnade or Portico, it is said to be *Diastyle*, *Tetrastyle*, *Hexastyle*, *Octastyle*, *Decastyle* or *Dodecastyle*, according to the Greek numerals. Examples are found at Argos, Assos, Thoricus and Pæstum of façades with an odd number of columns, three, five, seven and nine, a column instead of an intercolumniation coming on the axis, giving tristyle, pentastyle, heptastyle and enneastyle porticos. But in most of these cases the entrances were on the sides of the buildings, where there was an even number of columns.

SUPERPOSITION.

Superposition is the placing of one Order above another, as in the Roman Amphitheatres and in many modern buildings of several stories. The more solid forms of the Tuscan and Doric are naturally placed below, and the Ionic and Corinthian above. The Composite is sometimes placed below the Corinthian, as being more vigorous. But in high buildings it is generally placed on the top story, its large details being better seen at a distance than are those of the more delicate Order.

Even when the same Order is employed in the different stories it is advisable to have the upper Columns of smaller diameter than those below, and all the dimensions diminished accordingly, for the sake of lightness. But it is still more so when different Orders are superposed, for otherwise the Doric and Corinthian stories would overpower the Tuscan and Ionic ones beneath. It is usual, accordingly, to make the lower diameter of each Shaft equal to the upper diameter of the Shaft below it, as if they were all cut from a single piece of tapering stone. This makes the scale employed in the second story five-sixths of that used in the first; in the third, twenty-five thirty-sixths, or about two-thirds; in the fourth, about three-fifths, and in the fifth, about one-half, if the Five Orders are employed in regular sequence; this makes the relative height of the Orders in the successive stories to be as 7, $6\frac{2}{3}$, $6\frac{1}{4}$, $5\frac{5}{6}$ and 5, very nearly. The actual height of the stories themselves may be somewhat modified by the use of plinths and pedestals.

This system of Superposition makes the distance apart of the Columns in each story, when expressed in terms of their own Diameter, six-fifths of that in the story below. A Eustyle Intercolumniation in one story thus exactly produces a Diastyle Intercolumniation in the story above, and a Doric Monotriglyph Intercolumniation, a Systyle.

($\frac{6}{5} \times 3\frac{1}{3} = 4$; $\frac{6}{5} \times 2\frac{1}{2} = 3$.)

Coupled Columns set $1\frac{1}{3}$ D. apart, on centres, in one story, are, in the story above, $1\frac{3}{5}$ D. o. c., and in the third story nearly 2 D. o. c. This does very well for a sequence of Doric, Ionic and Corinthian (152). But if the lower Columns are Ionic or Corinthian those above may well be set nearer together, the axis of the Intercolumniation only being preserved (153).

With this exception Superposed Columns are set so that their axes are in the same vertical line, when seen in elevation. But in profile, as seen in section, the upper ones are set back, the wall against which they stand generally growing thinner as it goes up (154). Since the Columns themselves also grow smaller, it would not do to leave too much space behind them. The slightly pyramidal effect which this gives to a building of several stories is of great value, preventing it from looking top-heavy and high-shouldered.

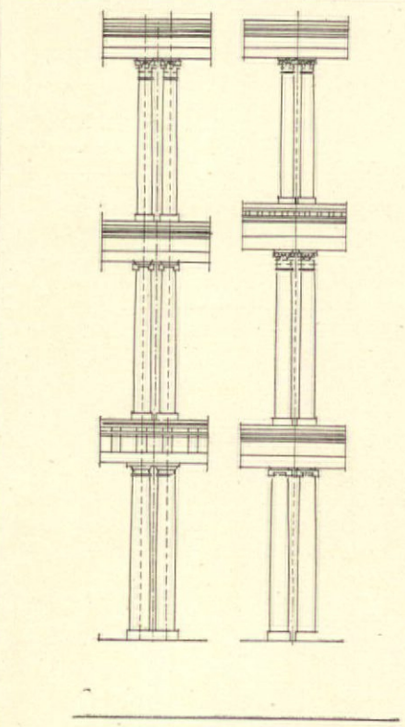


Fig. 152. Fig. 153.

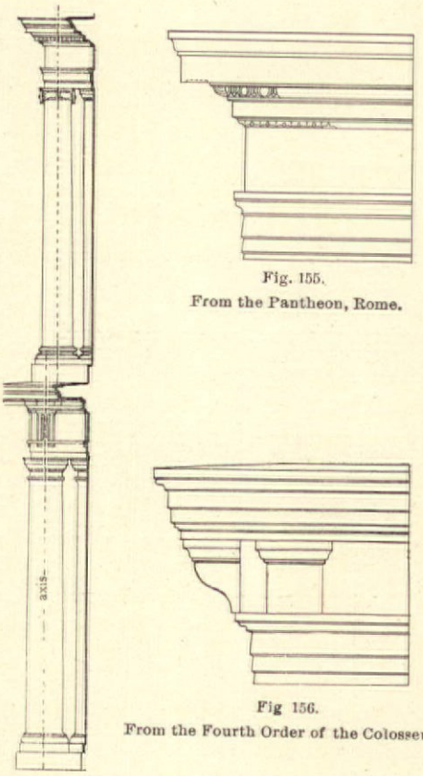


Fig. 154.

Fig. 155.
From the Pantheon, Rome.

Fig 156.
From the Fourth Order of the Colosseum.

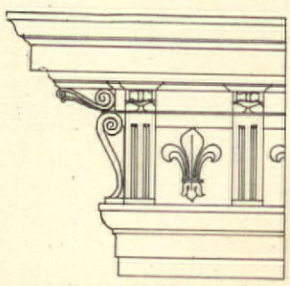


Fig. 157.
From the Villa Caprarola. By Vignola.

OTHER CORNICES AND STRING-COURSES.

The Five Orders worked out by Vignola are generally accepted as a standard, though they are seldom exactly followed in practice, modern as well as ancient examples exhibiting a great variety in the forms and proportions of the parts. But familiarity with them is of great service in designing, since they can safely be employed on all ordinary occasions, and in the earlier stages of architectural composition. Other types of nearly equal merit have been published by Alberti, Palladio, Serlio, Scamozzi, Sir William Chambers, and others, and a great variety of cornices, both with and without friezes and architraves, have been employed in ancient and modern times to crown and protect walls that were not decorated with columns or pilasters.

Many of these show Blocks or Modillions without any Dentil-course below, as on Palladio's Composite Cornice, and in many of them the Dentil-course is plain, forming what is called an *Uncut* Dentil-course (155). In others the brackets which support the Corona are brought down so as to occupy the Frieze (156). The most important

of these is Vignola's so-called *Cantilever Cornice* used by him at Caprarola (157). It seems to have been suggested by the Mutules and Triglyphs of his Mutulary Doric.

Cornices, and indeed full Entablatures, are often used as String-courses to separate stories, as in the Roman Amphitheatres. But it is customary to use, instead, a lighter form, of small projection, somewhat like the cap of a pedestal, in which the Cymatium and Bed-mould are often omitted, and the Corona itself sometimes diminished to a mere fillet (158 to 162).

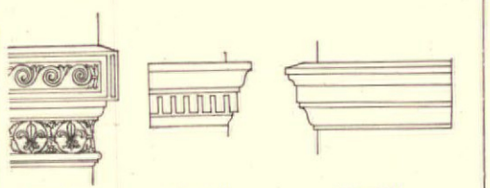


Fig. 158. From the Farnese Palace. By San Gallo.

Fig. 159.

Fig. 160. String-course from the Strozzi Palace.

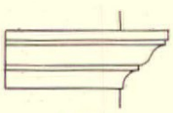


Fig. 161. String-course from the Palazzo Giraud. By Bramante.

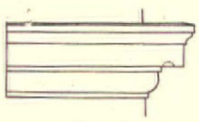


Fig. 162. String-course from the Sachetti Palace. By San Gallo.

ERRATA.

Vol. LXXIII, No. 1341, September 7, 1901; page 75, right-hand column, twenty-fourth line from the bottom: for "Mutules," read "Metopes." Page 76, right-hand column, lines eighteen, twenty and twenty-one from the top: for "degrees," read, "of a Diameter."

Vol. LXXIV, No. 1352, November 23, 1901; page 60, right-hand column: omit lines fifteen, sixteen, seventeen and eighteen from the bottom.

Vol. LXXVII, No. 1390, August 16, 1902; page 51, left-hand column, ninth line from the bottom: read, "a Regula as broad as the Triglyph." Page 53, left-hand column, eleventh line from the bottom: for "dentils," read "details."

Vol. LXXVII, No. 1394, September 13, 1902. Page 83, right-hand column, at the end of the third paragraph: for "three," read "two." Page 84, right-hand column, fifth line from the top: for "one-fourth," read, "about one-fourth."

Plates of the Doric Order; $\frac{7}{8}$ *D* at the top of the Capital should show the width of the Abacus, not that of the moulding which crowns it. For "$\frac{3}{4}$ *D*" above the Cymatium, read "1 *D*."

Plate of the Composite Order; for the height of the lower band of the Architrave in Palladio's Order, read "$\frac{2}{3}$" instead of "$\frac{1}{3}$."

W. R. WARE.

[The end.]

URALITE.

A DETAILED description of the new fire-resisting material uralite, invented by a Russian artillery-officer named Imschenetzky, is given in an interesting report made to the State Department by Consul-General Hughes, of Coburg. The substance is said to be virtually waterproof, is not affected by atmospheric conditions, and is a non-conductor of heat and electricity. It can be cut like wood with carpenters' tools, painted, grained, and polished, and is available for many purposes of interior construction and decoration. Mr. Hughes says that uralite is an asbestos fibrous substance, composed of asbestos-fibre, silicate, and bicarbonate of soda. It can be prepared hard or soft and used in a variety of ways. The process of manufacture, which is akin to that of paper-making, is given in full.

Mr. Hughes, in discussing the fire-resisting qualities of uralite, quotes an expert who speaks thus regarding some suggestive tests: "Three principal tests were made, and they fully proved that the material possesses the following qualities: (1) It is able to withstand intense heat for a long time without disintegration; (2) its non-conducting powers are uniform throughout; (3) it is capable of entirely preventing the passage of flame from any room where fire occurs; (4) after prolonged exposure to fire, it is able to resist water without serious damage; (5) exposure to changing atmospheric conditions does not effect it; (6) all the materials employed in its manufacture possess substantially the same chemical, physical, and thermal constants. In order to carry out the tests, a small brick-built house, an iron-framed hut, lined and covered with uralite, and a duplicate platform were erected. Each of these was fitted with pyrometers, recording the temperatures electrically, and was filled with highly inflammable materials. In the case of the platforms, the materials were distributed evenly under the two sections. To the test-house were attached four doors. One door was constructed with two oak boards $\frac{3}{4}$ inch thick. Next to the timber was a thin steel armor-plate, and over all was a covering of uralite. The second door, suitable for inside use, was built of two sheets of hard uralite running through the centre of the door and forming panels. The framework consisted of timber laid on either side. A door for warehouse purposes consisted of a thickness of soft uralite in the centre and oak on either side. Next to the timber was fixed a thickness of soft uralite, and the whole was covered by a layer of hard uralite. The stiles of the other door were constructed of oak, $1\frac{1}{2}$ inch thick, and the panels were filled-in with uralite cement. The timber was covered over with soft uralite, and on that a thin steel armor-plate was fixed. The whole was covered by hard uralite. In each case, the materials were fixed together by means of nails and screws.

"A fire was lighted inside the house and the doors were shut. The highest temperature reached was 2,350 degrees Fahr. After the test, it was found that in each case the doors had resisted the fire. It is interesting to note, however, that in the case of the second door practically all the wood outside was burned off, leaving the outer layer of uralite uninjured by the severe heat. The fire was left to burn for over an hour. In the hut was placed a deed-box made of the uralite and wood, and in the box were placed some papers, a book, a crucible containing paraffin-wax, and another holding a piece of easily fusible metal. After being subjected to an external heat of 2,030 degrees Fahr., the papers and book were not affected in the slightest degree. It was found that the wood nearest the fire was charred right through, but the middle layer of uralite was sound and the paraffin-wax had only melted slightly. The platform was 12 feet long and 6 feet wide, was built of wood, and but one-half was covered with uralite. After the fire had burned underneath it, and had reached 2,270 degrees Fahr., the unprotected portion was completely destroyed, but that covered with uralite was whole and strong and several of the visitors walked across it. After the fire in the small house had been going three-quarters of an hour, and when the pyrometer was registering 2,120 degrees Fahr., those present were able to place their hands in contact with any part of the door which was covered inside and out with uralite, though by this time the whole of the woodwork had been burned off the door which had uralite for its panels only.

"I afterwards witnessed some tests showing the crushing and breaking strain of the material. In the first, a cube 1 inch square, built up with sections, cut from standard sheets, was subjected to hydraulic pressure. A pressure of 19.8 tons was registered before they gave way. In the second test, a strip $9\frac{1}{4}$ inches long, $1\frac{1}{2}$ inches broad, and $\frac{7}{8}\frac{1}{4}$ inch thick was placed between supports and gradually subjected to an increasing weight placed at its centre. It did not break till a weight of 6 875 kilogrammes (just over 15 pounds) had been applied."

THE FABRIC FUND OF WESTMINSTER ABBEY.[1]

"AN insolvent Chapter and a ruinous fabric!" In such words, just twenty-one years ago, were his coming responsibilities described to the then newly-appointed Dean, Dr. Bradley, by one whose intimate knowledge of Westminster justified him in making so bold and discouraging an assertion — an assertion, moreover, in which it was only too quickly proved there was little exaggeration. There are probably few who remember, or at the time fully realized, the financial crisis through which the greatest of our national monuments had to pass between fifteen and twenty years ago.

Before the Dean who is now on the eve of his retirement had been a year in office, a report was brought to him by the architect and surveyor of the Abbey (the late Mr. J. L. Pearson) which aroused the gravest anxiety for the condition of the fabric. It was obvious that a very large expenditure was required, and without delay, to prevent the most serious results. How this expenditure was to be met was a matter difficult indeed for the Dean and Chapter to determine.

An Act of Parliament had been passed in 1868, followed by an Order in Council in 1869, by which the landed and other property belonging to the Abbey, much of which in the vicinity of London had increased enormously in value in the early years of Queen Victoria's reign, was finally transferred to the Ecclesiastical Commissioners. In accordance with a commutation or settlement then agreed upon, a certain portion of land and houses was made over to the Dean and Chapter, while another sum of equal amount in money was to be paid to them annually, a further sum of £20,000 being awarded for repairing the fabric. Unfortunately, however, the value of the lands assigned to the Abbey began rapidly to diminish after this settlement, a contingency which could not have been foreseen either by the Commissioners or by the representatives of the Chapter, who appear to

[1] Extracts from a paper by Miss Rose M. Bradley, in the *Nineteenth Century* for September.

have been at this time quite unaware of the real condition of the building, or of the constant and increasing demands which would be made for its repair upon the Abbey funds in the years that were to follow. And so it happened that in 1882 the revenues were scarcely sufficient to supply the reduced annual stipends of the officials. Fabric Fund, as such, there was practically none; and the Commissioners, however willing to readjust the settlement, had no legal power to do so, nor could they without fresh legislation assist the Dean and Chapter by an immediate grant. But neither could the Abbey be permitted to fall. In this dilemma an appeal to the country, and even to America, was suggested, which would no doubt have met with prompt response on both sides of the Atlantic. But the Dean felt strongly that the maintenance of a building of so exceptional a character should not be dependent upon the generosity of individuals, but should form a "matter of serious consideration to the Government and Legislature of the nation." And for six years the matter was very seriously considered, and much correspondence passed between the Dean (representing the Chapter), the Ecclesiastical Commissioners, and Her Majesty's Government. In 1886 an Act was passed authorizing a grant of £10,000 to assist the Dean and Chapter in remedying the "present insecure condition of the Abbey." In 1888 was passed the Westminster Abbey Act, followed by an Order in Council, by which a fresh and more satisfactory settlement was arrived at. The whole estates and property belonging to the Dean and Chapter, with the exception of the Abbey itself and the houses of the officials, were transferred to the Ecclesiastical Commissioners; they on their part to pay over an annual sum to the Dean and Chapter, sufficient for their necessary expenses, and a marginal sum to be set apart yearly as a Fabric Fund. As this latter could not in the existing emergency be sufficient, one of the six canonries was also suspended, and remains so to the present day. And so the work of repairing the Abbey was begun in serious earnest, and has been continued with little intermission for the last fifteen years.

In the light of these comparatively recent events it may be of interest to inquire why so great and national a church, linked by the closest of ties with Sovereign and people alike, should have had from its foundation no steadily accumulating fund set apart for its maintenance and what were the circumstances which led indirectly to so insolvent a condition.

From the completion of the first abbey church of Edward the Confessor in 1065 to the dissolution of the monasteries under Henry VIII in 1540, a period of five centuries, the erection and enlargement of the Abbey was mainly, though not entirely, the work of successive Kings. . . .

And through all these five centuries, which may be considered to form the first part of the history of the Abbey, whilst the building and beautifying of the church and monastery were in perpetual progress, no mention can be found of a Fabric Fund. What need, it may be asked, when the King in his palace close by was ever ready, not only to spend largely himself, but had decreed that the resources of the country must, if necessary, be drained to the uttermost for the enlarging and the embellishment of the burial-place of Sovereigns? What need again, when the Abbot, following the example of his royal master, could invariably obtain money by the easy impropriation of existing religious foundations, alien priories and tithes, as well as by other means alluded to above? Generosity of the hour was surely a pleasanter and more profitable virtue to practise than the dull forethought which would put by for a day when that same pile, now their boast and their glory, would crumble — a day which most certainly neither royal nor monastic builder would live to see. It must be remembered, moreover, that the question of repair and maintenance was less prominent during this period than that of construction. The buildings had not been exposed long enough to decay, nor was there a sufficient amount of coal-smoke in the atmosphere of mediæval London to be deleterious. And, most powerful reason of all, there was no feeling against demolishing the work of former generations in order to replace it with new buildings. Nevertheless, there is evidence that the *maintenance* and *repair* of the Abbey had occasionally been a heavy tax upon the community. . . .

Sovereigns continued for a time to erect tombs for themselves and their predecessors. But with the change of religion the bond between King and Church became necessarily less intimate, and the shrine of the sainted Edward the Confessor held less significance for his successors. . . .

The period of the Civil Wars was naturally a disastrous one for the Abbey; but previously, in 1603, on the accession of James I, we find an item in the Chapter Book which shows that an effort had been made in the right direction: "That provision shall be made of lead, stone, timber, and other necessaries towards the reparation of the Fabrik of the Church yearly, to the value of Forty pounds, layd up in the store house, not to be imployed without the consent of the Deane," and a further item which gives authority for the use of the same to "the Treasurer for the time being, with the consent of Mr. Deane," an order which is observed to the present day. Immediately after the Restoration, large fines having been received for leases, considerable sums were expended both in repairing and refurnishing the church, from which the ornaments had been carried off during the Great Rebellion. . . .

In 1624 we learn that one Christopher Tamworth gave £20 to the repair of Westminster Abbey; but it remained for Dean Dolben, appointed in 1662, to make the first genuine effort to establish a permanent Fabric Fund. He prevailed upon the Chapter to assign henceforth "a Prebend's share" (*i. e.*, one-fifteenth of the total annual income) "to be reserved and employed for the repairs of the Abbey," the roof and vaulting of which were said to be in actual danger. So much importance was very properly attached to this measure of Dean Dolben's, who afterwards became Archbishop of York, that to his long epitaph on his monument at York are added the words "*Cœnobio Westmonaster: Conservato.*" This practice of setting aside one-fifteenth, or a Prebend's share, was adhered to until the estates were handed over to the Ecclesiastical Commissioners in the last century. . . .

Year after year further sums were petitioned for and granted for the repair of the fabric, amounting between 1809 and 1822 to no less than £42,000. Dean Dolben's settlement of the one-fifteenth continued to be set aside, and was aided by the produce of all sales of timber, notably of the scaffoldings used for Coronations — a perquisite of which the Abbey can no longer boast — and of the fees paid for the erection of monuments. In pursuance of an Act of Parliament in 1840 the number of Canons was reduced from twelve to six, and in 1868 Westminster School, by the Public Schools Act, ceased to be a part of the establishment of the Abbey, and no longer demanded the repair of its buildings from the Chapter. Matters did not improve, however, even with the rapidly increasing value of the London property, for while the stipends of the Chapter became disproportionately large, no definite sum was set aside towards the Fabric Fund. With the commutation of 1869 even Dean Dolben's modest allowance ceased to exist. It needed, as we have seen, another Act of Parliament and strenuous efforts on the part of the custodians to establish at all events the foundations of a permanent working Fabric Fund, and to save from ruin the last resting-place of those who through ten centuries have contributed, whether as Sovereign or subject, to the greatness of our Empire. For the present Westminster Abbey is saved; but its history, even as given in these few pages, is full of warnings of the absolute necessity for unceasing watchfulness on the part of those entrusted with the care of buildings exposed through a long series of years to the action of a London atmosphere.

ZIMBABWE RUINS.

THE secret of the ancient ruins of Zimbabwe, with its acropolis, temple and forts, has not yet been laid bare. It is still uncertain to whom we owe these mysterious structures and at what date they were erected. A very good case has been made out for identifying Zimbabwe as the Havilah of the Old Testament, and for supposing that Phœnicians or descendants of Phœnicians had a hand in its erection. One thing is certain: that the buildings are not the work of any of the present natives of South Africa, although they may have been used over and over again by local tribes. Native implements found in the ruins prove this. Perhaps the greatest puzzle is the *raison d'être* of the situation of the ruins. The acropolis is situated on a kopje 250 feet high in a plain surrounded by hills, and affording an extensive view along several valleys. The temple is situated in this plain, and down one of the valleys there is a long chain of forts striking eastward as if making towards the coast. The curious part is that there are in the immediate vicinity none of the ancient gold-workings which abound all over South Rhodesia, and there still exists the unsolved problem of the situation of Zimbabwe.

Perhaps in the near future the truth may be disclosed. The Government of South Rhodesia, says the *Scotsman*, have taken a very important step for the preservation of the ancient ruins. They have appointed Mr. R. N. Hall, who is joint-author with Mr. Neal of "*The Ancient Ruins of Rhodesia*," as temporary curator of Zimbabwe. It is to be his work to clear away all rubbish and vegetation that tends to conceal or to destroy the buildings. Mr. Hall arrived at his station on May 23 and already a great amount of work has been done. The walls enclosing passages which wind round and up the kopje to the enclosures on the top have been laid bare, and passages have been disclosed which were not previously thought of. Two of these passages, 20 and 30 feet long respectively, and between walls 8 feet high, were so concealed with rubbish that the visitors' path crossed right over them. Two large ancient entrances have also been discovered. They had been used by the native Makalangas for graves. Other architectural discoveries are a wall with dentelle pattern, a cement-lined enclosure and three wedge-shaped buttresses. The buttresses are of peculiar interest, being the first discovered in Rhodesia. Naturally, in the rubbish cleared away many "finds" have been made. These include the characteristic soapstone birds, beams and bowls. The birds are decorated in the usual fashion, and the beams and bowls show chevron and cord patterns and sometimes figures of animals. Pottery and iron tools have been discovered, but whether they are of very ancient date it is impossible to say. At any rate, they are not such as used by natives of the present day. Perhaps the most valuable discovery is a gold bangle of wirework, weighing 3½ ounces, and a beaten gold-cap, or ferrule.

Although the acropolis, with its winding walls of granite blocks, its monoliths and chambers, is the most imposing ruin, the most interesting ruin and the one in which more "finds" are likely to be

made is the temple in the plain below. A few months ago the interior of the elliptical temple was one impenetrable jungle of trees, bushes, tall grass and creepers. The monkey-rope tree and the wild vine have committed great depredations, and the last remnant of the herring-bone pattern on the wall was fast disappearing. Mr. Hall's arrival was very timely. With the help of fifteen natives he has cleared away all the undergrowth and stumps, and now for the first time an uninterrupted view of the whole structure can be obtained. The most striking object is the large conical tower about 15 feet high, which is suggestive of the old Phallic worship. This cone has suffered somewhat from the growth of trees, and is now slightly tilted. The architectural discoveries made in the temple are: four ancient drains, a double-curved rounded entrance, three sets of stone steps, and several yards of ancient cement-flooring. The cement-flooring is not original with the building. There has also been made clear a large portion of architecture which is of later date than the original building, but built on the top of an original wall. The "finds" in the temple are similar to those on the acropolis. Altogether twenty-five monoliths have been found. Among the soapstone ornaments is a section of an ancient soapstone bowl believed to be the missing portion of a large bowl lent by Mr. Rhodes to the Cape Town Museum. A collection of curious stones, foreign to the district and of odd natural shapes, was also found.

The work undertaken by Mr. Hall is purely that of clearing away the rubbish and making known the nature of the structures. No excavations are being made, so there is still plenty of scope for discovery. It is impossible to imagine that the Government mean to retain Mr. Hall only temporarily. The excellent work he has done ensures his being entrusted with further research. There are so many old ruins in South Rhodesia that it will take years to investigate the whole of them. Mr. Hall has not been unmindful of visitors, and direction-posts have been erected everywhere either to direct people to particular ruins or to indicate the particular nature of the chambers or enclosures. Zimbabwe is three hours' journey in a Cape cart from Victoria, in the south of South Rhodesia. Victoria is reached by coach now from Gwelo, which in a very short time will be connected with Bulawayo by rail. Doubtless, tourists in making the grand tour of South Africa through Kimberley and Bulawayo to the Victoria Falls will take the opportunity on their return journey to make a deviation to the unique ruins of Zimbabwe. It is to be noted that Victoria and Victoria Falls are not to be confused. They are several hundred miles apart. — *The Architect.*

IRON AND STEEL SLAG.

THE utilization of iron and steel slags is discussed in "*Mineral Resources of the United States*, 1901," now in press, United States Geological Survey, by Edwin C. Eckel, who says that, although the greater portion of the slag annually produced by iron and steel works is not available, a great deal of slag is used in the manufacture of cement and of slag brick, as a fertilizer, and in the form of mineral wool; also, to a less extent in the manufacture of paint-stock, alum and glass, and a considerable quantity is disposed of less profitably as road-material, railroad-ballast and in land reclamation.

The most important of these uses of slag is in the manufacture of structural materials, especially in the manufacture of hydraulic cements. Slag-cement is produced by pulverizing, without calcination, a mixture of granulated basic blast-furnace slag and slaked lime. This product, although really a pozzuolanic cement, is usually marketed as "Portland-cement," in spite of differing from true Portland-cement in manufacture, composition and properties. Six or eight plants are at present engaged in manufacturing slag-cement in the United States, the production for 1901 being 272,689 barrels. As slags cooled slowly are only feebly hydraulic, the slag used in the manufacture of slag-cement must be cooled as suddenly as possible. This is done by bringing the slag, as it issues from the furnace, in contact with a jet of cold water. This granulates the slag, renders it strongly hydraulic, and removes most of the sulphur. True Portland-cements can be made from mixtures of which one element is blast-furnace slag, in which case the slag is ground, intimately mixed with powdered limestone, and the mixture then calcined and reground. Two plants are engaged in the manufacture of Portland-cement from slag and limestone in the United States. In England blast-furnace slag has been somewhat largely employed as an adulterant of Portland-cement.

Slag run into moulds on issuing from the furnace furnishes blocks which have been used for paving, notably in Philadelphia. These slag-blocks are very durable, but objectionable because of their slipperiness, which, in English practice, has been overcome by the form of the mould used.

The manufacture of slag brick can hardly be considered as being more than a specialized phase of the manufacture of slag-cement. On issuing from the brick-machine the bricks are placed on racks to dry, which takes from 6 to 10 days, at the end of which time the bricks are ready for use. Slag bricks are light in color; they weigh less than clay bricks of equal size, require less mortar in laying up, and are equal to clay bricks in crushing strength.

The highly phosphatic slags produced by basic Bessemer converters are valuable fertilizers, and in Germany, especially, large quantities are annually sold under the name of Thomas silicate. These phosphate-slags are more efficient as fertilizers than the mineral phosphates. The slight development of the basic Bessemer-steel industry in the United States necessarily renders the use of these phosphatic slags of less commercial importance than in Europe. During 1901 about 1,000 tons of phosphate-slags produced in the United States were sold as fertilizer. This American material has been tested by the American Agricultural Experiment Station, which reports that slag-phosphate gave a greater total yield than did any other insoluble phosphate. The slags produced in steel-plants using the open-hearth process are less valuable as fertilizers than those produced by basic Bessemer converters, as they contain less phosphoric acid and more silica and lime than the basic Bessemer slags.

Over half the material marketed as "mineral wool" or "silicate cotton" is derived from slag, the remainder being manufactured from natural rocks of several different types. During 1901 about 3,500 tons of mineral-wool were made from slags in the United States. The most important property of slag-wool from a commercial point-of-view is that it is a very poor conductor of heat, which property renders it very valuable for all uses for which a non-conductor is desirable, as steam-pipe coverings, safe-linings, etc.

Slag has been utilized in the manufacture of paint-stock, in the preparation of alum, and, in small quantities, in the manufacture of inferior grades of glass.

About 5,000 tons of slag were sold in 1901 in the United States for use in constructing macadam highways and for railroad-ballast. Sections of roads constructed in New Jersey with slag macadam, under State supervision, have proved entirely satisfactory. Slag has been used in highway-construction to some extent near Buffalo, N. Y.; to a greater extent in Pennsylvania and Alabama, and most extensively in the counties of Baltimore, Howard and Prince George, Maryland, where, under certain conditions, it has been found highly satisfactory road-material. In several States, notably in Alabama, slag is largely used as railroad-ballast. Large quantities of slag are also used for reclaiming land and filling abandoned mine-workings.

BOOKS AND PAPERS.

MR. CROWNINSHIELD'S second book of poems[1] is quite equal in interest to the first, and shows, as it seems to us, increased smoothness and delicacy in versification. As before, he has chosen, notwithstanding its difficulties, the sonnet form for most of his work, and uses it with great skill. Perhaps the introductory sonnet, "Cor Pictoris," pleases us most, but all of them fulfil the condition essential to the sonnet, of a complete and interesting thought expressed in almost faultless verse. To one who has mastered the difficulties of the sonnet, ordinary versification is a simple matter, and Mr. Crowninshield's longer poems, some of them by no means simple in form, are models of smoothness. It is, possibly, unfortunate for modern poets that their sympathies are claimed by a multitude of interests, more or less discordant; and Mr. Crowninshield, who finds himself impelled to take poetical consideration of Browning's letters, Renaissance painting, popular actresses and imperialism, besides the usual topics of religion, landscape effect and various forms of affection, is at a certain disadvantage in regard to the unity of impression which he makes upon his readers, in comparison, let us say, with one who devotes himself exclusively to the merits of Laura or of Vittoria Colonna; but he is, at least, the more interesting in consequence.

Not the least of the attractions of the book is the charming set of illustrations. After the "poster" horrors in the way of book-ornamentation with which we have been deluged for so many years, it is truly refreshing to find drawings that really look like something,—figures drawn with some reference to the proportions of the human body, and shaded in imitation of nature, not of Beardsley, and landscapes in which the clouds are quite distinguishable from the trees, and the latter have the actual air of vegetation. To these the author adds a beautiful design for the cover, stamped simply in gold on cloth of a pretty tint, while the lightness of the paper makes the book very pleasant to hold, after the ordinary clay-loaded volume.

ILLUSTRATIONS.

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

CIRCULAR GREEK TEMPLE FOR BENJAMIN BARKER, ESQ., TIVERTON, R. I. MR. W. W. BOSWORTH, ARCHITECT, NEW YORK, N. Y..

NOS. 13 AND 15 BEACON ST., BOSTON, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

HOUSE FOR ARTHUR W. POPE, ESQ. MR. GEORGE H. INGRAHAM, ARCHITECT, BOSTON, MASS.

[1] "*A Painter's Moods.*" By Frederic Crowninshield. With illustrations by the Author. New York: Dodd, Mead & Co., 1902. Price $2.00.

DINING-ROOM FOR OLIVER W. MINK, ESQ., MANCHESTER-BY-THE-SEA, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

SUPERPOSITION AND INTERCOLUMNIATION.

For description of this plate see article, "The American Vignola," elsewhere in this issue.

[The following named illustration may be found by reference to our advertising pages.]

A VIEW IN CHARLESTON, S. C.

[Additional illustrations in the International Edition.]

LAWN FRONT: HOUSE OF EDWARD J. BERWIND, ESQ., NEWPORT, R. I. MR. HORACE TRUMBAUER, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF WM. H. OAKES, ESQ., WABAN, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

CHOIR DETAILS: ALL SAINTS', GREAT NECK, LONG ISLAND, N. Y. MESSRS. CRAM, GOODHUE & FERGUSON, BOSTON, MASS., AND SILAS McBEE, ASSOCIATED ARCHITECTS.

DETAILS OF ROOD-SCREEN: ALL SAINTS', GREAT NECK, LONG ISLAND, N. Y. MESSRS. CRAM, GOODHUE & FERGUSON, BOSTON, MASS., AND SILAS McBEE, ASSOCIATED ARCHITECTS.

DETAILS OF REREDOS: ALL SAINTS', GREAT NECK, LONG ISLAND, N. Y. MESSRS. CRAM, GOODHUE & FERGUSON, BOSTON, MASS., AND SILAS McBEE, ASSOCIATED ARCHITECTS.

ALTAR AND REREDOS: ALL SAINTS', GREAT NECK, LONG ISLAND, N. Y. MESSRS. CRAM, GOODHUE & FERGUSON, BOSTON, MASS., AND SILAS McBEE, ASSOCIATED ARCHITECTS.

NOTES AND CLIPPINGS

Changes in the White House. — The north door of the White House, through which for a century visitors have passed, will hereafter be the entrance only for the President and his immediate family, domestic and official. Visitors will henceforth enter through the new eastern basement door. Where formerly was the laundry will now be the entrance-hall, and a wide staircase up which the visitor will ascend to the President's room. There will really be four White House entrances under the new order. The politicians and business callers will go to the temporary office-building on the west of the grounds; the diplomats and the like will be received at the south-front basement entrance; family and personal callers at the old front door, while the great crowds for the winter receptions will enter near the Treasury through the new terrace. The *porte cochère* there will accommodate four carriages at a time. There will be entrances also for persons on foot, but all leading to the same dressing and cloak rooms, which will be arranged so that the incoming tide will not interfere with the outgoing one. The only essential partition change of the White House first floor is that by which the state dining-room absorbs the west end of the main corridor, where the stairway used to be. The Red, Blue, and Green Rooms will remain. The East Room is much the same, except that it will be more beautiful. — *New York Times.*

Arbitration of Labor-disputes in New Zealand. — The experience of New Zealand with compulsory arbitration ought to be ascertained with exactness before this country proceeds further in its labor legislation. Mr. Frank Dillingham, our Consul at Auckland, not long ago discussed the question, but in that colorless way which characterizes the consular reports. He related that some manufacturers complained that they could not keep pace with competitors in other countries who had longer hours and cheaper labor. There can be no doubt that New Zealand is the paradise of organized labor and popular reforms. The arbitration-courts are composed of three judges, the chief of whom is appointed by the Governor and the other two by the parties in the controversy. The Court has power to enforce its mandates by all the processes incident to a Court of Record in the United States. It has power to fix minimum wages and to settle all manner of disputes. It is permitted the utmost freedom in the admission of evidence, and in technical cases often appoints a special commissioner to investigate. All industrial unions are registered, or incorporated, in order to have the right to appeal to the Court of Arbitration. Agreements with such industrial unions must be in writing. It seems to be generally conceded that New Zealand possesses such great natural resources that it could stand, for many years at least, almost any system of industrial operation. Whether the present one, with its old-age pensions, Government railroads and granaries, works well, is much disputed. A Congressman who visited there last summer gave as his private opinion that the natural resources of New Zealand received the highest compliment that could be paid to those of any country in the fact that they permitted New Zealand to hold its head up out of the ocean, in the face of the wastefulness and folly which accompanied its industrial system. Of course, the piling up of public debts, which has been going on rapidly, is preparing a problem for the future to settle. On the other hand, Mr. Henry Demarest Lloyd's books have given the American public an opposite impression of New Zealand, and between the two people can take their choice. Those who think that Tammany Hall would run the business enterprises of New York to better advantage than its great merchants, or that the Quay organization in Pennsylvania would run the coal-mines better than Mr. Baer and his associates, will naturally take Mr. Lloyd's view, and believe that his representation of New Zealand conditions is judicious. — *Lincoln in the Boston Transcript.*

German Pumice-stone Bricks. — According to a recent German report, there is in the Neuwied district along the Rhine, between Coblenz and Andernach, an extensive industry in the manufacture of bricks from volcanic sand and pumice-stone, which are found along the base of the Eifelberg. In working the deposits, the surface soil is stripped off, and the sand is piled up, to be shovelled into the mixing-bed of water and lime close at hand. The pumice comes out of the earth in pieces varying in size from grains to lumps some 4 inches across. It occurs in layers, but is frequently interrupted by small patches of more solid fragments of lava. Before moulding, the pumice is screened, larger pieces being broken to pass through a sieve with half-inch meshes. These screened pieces are then covered with a thin coating of cement, and the brick is moulded. The cement is not mixed with the pumice so as to form solid cement blocks, but by the fragments being coated first. The brick is then obtained by these coatings adhering to one another. In the manufacture of 20,000 bricks about 4½ tons of lime are required. After the mixing process, the substance is poured into iron moulds provided with bottoms of detachable boards, which, after the removal of the moulds, act as driers. When the bricks have been exposed to the air for a very short time they are ready for shipment. No modern machinery is used. A workman makes from 800 to 1,800 bricks a day. — *Exchange.*

Relics of the Lisbon Earthquake. — An interesting discovery has just been made in Lisbon which recalls the great earthquake of 1755. During some building excavations made in the Sé quarter of the city, a portico of great beauty was uncovered. Its entrance, which was closed by massive bronze doors, was thrown open, and a lofty and ornate chapel was found containing several tombs of more or less note. One of them, that of an infant, was opened and found to hold the skeleton of a female child clad in a gorgeous gold-brocade vestment, covered all over with "glories," or representations of the Holy Ghost. The tissue of the garment is still in admirable condition, and bears handling and stretching, but it is feared ere long exposure to the air will destroy the fibres and the colors. The Lisbon Archæological Society has taken possession of the relic. Further investigation proved that the remains are those of a child of Dom Pedro. Other tombs will be searched as the excavation proceeds, and rumors of additional valuable finds are already afloat. — *N. Y. Times.*

A famous Walnut Log. — The *Timber Trades' Journal* for July 12th gives the following translation of the history of a walnut log just received at Liverpool from Italy: "Referring to the log of walnut you have (sic) purchased from my brother, Anthony, last year, he got it from my deceased father, John Baptist, on April 24, 1892. My father got it on February 20, 1863, from Charles Dellanegra, who got it hereditarily from his mother, Ketty Cana, on September 28, 1840. Ketty Cana got it hereditarily from her father on April 6, 1788. The said John Baptist Cana was in possession of it before it was established in the rent-roll of this department, which was in 1768. From an old legend existing in this department it seems the said John Baptist Cana who built up the wine-press in 1747, and taking (took?) the walnut-tree from one of his properties once possessed by Count Louis Salomone in the place called Isola in the territory of this department. It is also said that there were not sufficient oxen in the region to carry the tree, which was yet green, to the place where the house was subsequently placed after having built the press. It was necessary to provide half a cow, with much bread and wine, to compensate the men who helped for the carrying of the famous log, which was considered a rarity in the country of Serrevilla. This is all I have been able to get by searching in the archives of the department and by speaking with the oldest men of the country." The account is accompanied by a lithophoto illustration of the log in question, the dimensions of which are quoted as about 26 feet long and 3 feet to 3 feet 4 inches square. — *Notes and Queries.*

The Depth of Glaciers. — For many years efforts have been made to ascertain the exact depth of glaciers by boring, but mechanical and other difficulties have hitherto frustrated the carrying out of this method of inquiry. A few days ago, however, Professors Blumke and Hess, from Bavaria, who are well known for their studies of glaciers, succeeded in boring through the Hinteries glacier, in the Otzthal Alps, at a point where the ice was found to be 153 metres deep. The machine used for boring was driven by hand, and is somewhat similar to that usually employed for experimental boring in mines, but was fitted with special arrangements for washing out fragments of ice from the bore-hole, to prevent their freezing together again. The expenses of the undertaking, which amounted to many thousands of marks, were borne by the German and Austrian Alpine Club. — *London Telegraph.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, NOVEMBER 1, 1902 No. 1401

CONTENTS.

SUMMARY: —
An inquitous Enhancement of Duties on imported Steel Billets. — Massachusetts and the Incorporation of Labor Unions. — Invasion of Fifth Avenue, New York, by a Speculative Building. — Building-regulations in Their Application to Residential Districts. — The Advantages or Disadvantages of the Carnegie Gift Library. — The Villa Borghese bought by the Italian Government. 33
RELATIVE COMPRESSIVE STRENGTH OF GRAVEL AND BROKEN-STONE CONCRETES. 35
CORROSION OF STEEL FRAMES OF BUILDINGS. 36
LABOR-TRUSTS THE WORST. 37
FERRO-CONCRETE. 38
THE STRENGTH OF FERRO, OR ARMORED, CONCRETE. 38
BOOKS AND PAPERS. 38
ILLUSTRATIONS: —
United States Government Building: Louisiana Purchase Exposition, St. Louis, Mo. — House of James Means, Esq., No. 191 Bay State Road, Boston, Mass. — House at Detroit, Mich. — House at Torrington, Conn.
Additional: The Zabriskie Memorial Chapel, Newport, R. I. — Lower Stories: No. 191 Bay State Road, Boston, Mass. — Doorways, etc., in Aix, Bouches-du-Rhône, France: — The Tower of St. Augustin; — Hôtel d'Espagne, Cours, Mirabeau; — Door in the Rue Espariat. — Doorways at Aix, Bouches-du-Rhône, France: — Hôtel de Panisse, Rue E. David; — Hôtel d'Agut, Place des Précheurs. — Station of the Electric Elevated and Underground Railway, Berlin, Prussia. 39
NOTES AND CLIPPINGS. 39

A DECISION has been made by the Board of General Appraisers which is of considerable importance to persons interested in steel construction. As every one knows, the demand for structural steel in this country is so large that it is impossible to secure early delivery, and many thousands of tons of steel and iron, both crude and manufactured, are now imported, notwithstanding the heavy duties and the cost of importation. Much of the imported steel comes from Germany, and, a few weeks ago, a firm in Philadelphia had occasion to import a thousand tons of steel billets from that country, to be made up into sheets and rods. Under the Dingley tariff, the duty on steel billets, of the value of one cent a pound or less, is three-tenths of a cent per pound; but, if the value of the billets is between one cent and one and one-quarter cents, the duty is four-tenths of a cent per pound. The Dingley tariff further provides that the duty shall be calculated upon "the actual market value or wholesale price of such merchandise at the time of exportation to the United States in the principal markets of the country from which the same has been imported." A censorious person would be likely to say that this clause was, apparently, devised for the express purpose of involving importers in a lawsuit over every package of goods that they ventured to import, by substituting an indeterminate and arbitrary standard of value for the natural one of the invoice price. In the present instance, the importers of the steel billets, who paid for them eight-tenths of a cent per pound for the whole consignment of one thousand tons, thought, not unnaturally, that this fact afforded good evidence of the wholesale price of the billets at the time when they were bought, and in the market in which they purchased them, and prepared themselves to pay the duty of thirty-seven per cent. They reckoned, however, without their host. When their cargo arrived, it appeared that the custom-house officials held the view, based on evidence, the nature of which is not explained, that billets of this kind, although actually sold to the Philadelphia importers at eight-tenths of a cent a pound, were really worth one and one-thirtieth cents per pound. This valuable discovery brought with it the conclusion, perhaps not wholly unexpected, that the billets came under the second category of the Dingley law, and were, in consequence, liable to a duty of four-tenths of a cent per pound, or fifty per cent of the actual cost. In order to impress the circumstances on the minds of the people interested, a penal duty was imposed, in addition to the enhancement of the original duty, so that the importers, in place of the two thousand dollars which they had expected to contribute to the treasury of their country, were compelled to pay four thousand five hundred and fifty dollars. It should be observed that no claim was made by the Government of any undervaluation or lack of perfect integrity on the part of the importers, but the custom-house officials, under the present interpretation of the Dingley law, which assesses duties, not on what imported articles actually cost, but on what the officials in this country think they ought to have cost, simply exercised their prerogative in fixing their ideal of the proper value high enough to bring the goods under a different class. The importers, who, of course, do not charge the appraiser with anything worse than misapprehension of the facts, say that the price of one and one-thirtieth cents per pound, which the officials take to be the wholesale price of such steel in Germany, is simply the quotation for small lots, large transactions in steel billets being unusual in Germany, where all the rolling-mills and other large consumers make their own steel. Under this view, the price which the custom-house officials had heard of was really the retail price, and the wholesale price mentioned in the Dingley Act might fairly be considered to be somewhere near that at which the wholesale transaction was made. It must be acknowledged that the importers' contention is strengthened by the consideration that if the steel-maker of whom they bought their billets had known of any market in Germany in which he could have sold his goods for a cent a pound or more, he would not have been likely to sell them to the Americans for less than four-fifths of that price; and he might be presumed to know as much of the markets of his own country as the custom-house officials in New York. However this may be, the question is one which affects importations of many thousands of tons of steel already contracted for abroad, and, through them the pockets of many thousands more of American consumers of articles into which steel enters as a material, of tenants of steel buildings, and travellers over steel rails, all of whom will be compelled to contribute their portion, in the shape of increased price, or higher fares, or extra rent, to the new view of duties on the raw material.

A SERIOUS effort is to be made, at the next session of the Legislature of Massachusetts, to have an act passed under which all labor unions must be incorporated. The proposed legislation will, it is presumed, be opposed by most of the present labor leaders, but it may be hoped that the advantages of it to the workmen themselves will, before the time comes for action, be better understood than they are now. The obvious effect of incorporation of the unions will be to make them responsible bodies, capable of suing and being sued, and therefore entitled to enforce their contracts with either individuals or corporations, at the same time that they are bound by their own agreements. The importance of this, especially at the present time, when so much business is done by corporations, is so great that one of the principal trade-unions in the West has declared itself in favor of incorporation, for its own benefit. There are, however, other advantages which the members of unions gain by incorporation. While labor organizations were shadowy affairs, consisting mainly in assertions of their pretended chiefs, it was difficult to impose any responsibility on those whose membership in them could easily be denied. Now, however, the labor unions are becoming every day more definite bodies; their contracts, although still often broken, and, under present circumstances, with impunity, are more respected than ever before; and those who belong to them are less likely now than formerly to deny or repudiate their membership. This increased dignity and stability of the unions brings with it, however, a certain danger. Under certain circumstances, for example, any member could be held personally liable for all the debts of his union; or, in case of violation of the laws, an innocent member might be made legally responsible for all the damage done by other members. It is, to a great extent, to protect men from unlimited liability for the acts of their associates that the laws governing corporations have been enacted, under which the responsibility of each member of the corporation is defined and limited; and the members of unions are quite as likely as the participants in business enterprises to find this protection of value.

THE New York *Times* tells a story which has a rather familiar air. Every one knows that Fifth Avenue, in New York, from Fiftieth to Ninetieth Streets, is inhabited almost exclusively by enormously rich people, who pay from one hundred to two hundred dollars per square foot for land on which to erect palaces. Notwithstanding the general character of the district, there are no restrictions on the use to which land shall be put, and ingenious speculators are, naturally,

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

exposed to the temptation to get hold of lots, and, by threatening to build objectionable structures on them, induce the neighbors to buy the lots at a good profit. Years ago, this artifice was practised on Fifth Avenue with great success, and a certain little liquor store is said to have been bought out many times, to the great advantage of its proprietor. In those days, however, thirty dollars a square foot was reckoned a good price for lots on "the Avenue," and all New York marvelled at the sale, at sixty-five dollars a foot, of a lot which would now easily bring three hundred. As the retail liquor business, even in New York, will hardly bear an investment of two or three hundred thousand dollars, at least, for a site for a small saloon, the millionaires of upper Fifth Avenue have enjoyed, for a long time, comparative immunity from alarm; but it now appears that a speculator has bought a twenty-five-foot lot in the very heart of the millionaire district, and proposes to erect upon it a fifteen-story structure, presumably an apartment-house, since an office-building in such a locality would look in vain for tenants. The *Times* is much distressed over this intrusion into a region which, whatever may be said of the architecture of some of the houses, has, in general, a pleasant air of solid and quiet wealth, but, in the absence of any restrictions, it is difficult to see how the proprietor of the lot, if he chooses to ruin himself by building an apartment-house on such costly land, can be prevented from doing so. The *Times* appeals to the example of what it calls the "paternal Government" of Paris, under which such intrusions would be impossible, and bewails the absence, in our cities, of a stricter regulation of the height and character of buildings on given streets.

IT may be said, in the first place, that it is not the "paternal Government" of Paris, the Municipal Council of which would be much amazed to hear itself described by such a name, but the universal respect of the French for artistic propriety, which has led to the regulation, with the acquiescence of the public, of the heights and character of buildings. In the case of the Rue de Rivoli, the most uniform of all Paris streets, the land was condemned and purchased by the Government, and, after the widening of the street, resold under the restrictions as to the arcading of the first floor, and the heights of string-courses and cornices, which have made it what it is; and the Rond-Point de l'Etoile, which offers the richest and most imposing of the Parisian frontages, was restricted in the same way, although even more closely; but, apart from these instances, there is, so far as we remember, no case in Paris where any restrictions are placed on building except those intended to preserve light and air, by restricting the heights of vertical walls, and the profiles of roofs. It is true that these tend to produce uniformity, for the reason that every owner is naturally disposed, for his own advantage, to build to the full height allowed by law; but the artistic instinct of the French leads them so generally to build their houses with some regard, in design, to their surroundings that the effect is to produce a sort of uniformity of politeness, if we may use such an expression, which is not legally required in Paris, any more than it is in New York or Boston, but which very happily replaces the air of elbowing self-assertion so common in street effects in both these cities. We do not say that the proprietor of a house on Fifth Avenue or Beacon Street is any more likely to be rude in his manners than the dwellers on the Avenue du Bois de Boulogne or the Parc Monceau; on the contrary, the readiness with which the proprietors of American city lots enter into agreements for reserving space around their houses, or going without stables, shows that they are as well disposed as any others in the world toward that mutual courtesy which should display itself in their dwellings, as it does in their manners; but they do not know how to give to the brick and stone of their houses the expression that they would like, and it should be the part of the architects to lead them in the matter. In New York, and still more in Boston, where there are yet unbuilt upon whole districts of what will soon be a populous and fashionable quarter, it would be easy to establish limitations of height of cornices and principal string-courses, level of first floor, and, possibly, material of fronts, which would add greatly to the beauty of the blocks of new houses. To avoid monotony, the restrictions might differ, to a certain extent, in the various blocks, and care should be taken not to make such limitations as would shut out an interesting variety, even in the same block. If the question could be at first maturely studied by the architects, there would be little difficulty in persuading owners to accede to restrictions which would benefit them as much as their neighbors, and the example of a single block, built without the convulsed sky-line, the leaping up and down of front doors, and the ham-sandwich effect of alternating vertical slices of red brick, white marble, brownstone, yellow brick and limestone, would do much to educate the public to a better conception of civic architecture.

IT is to be regretted that certain journalists have created a little sensation by the discovery, which they profess to have made, that the acceptance of gifts of libraries, and other public benefits, from the munificence of private individuals, tends to pauperize communities. They call to mind a time when, as they allege, public improvements were made by voluntary contributions of the citizens, or by taxation, and draw a sad picture of the spread of municipal mendicancy. It would be interesting to the student of history to know at what time, and in what place, any library has ever been erected, or any park laid out, by the voluntary contribution of any considerable number of citizens. So far as we can judge from the experience of the world, for at least two thousand years, libraries, museums, universities, hospitals, parks and other important public benefits have always been conferred upon the community by some rich citizen, or, occasionally, by the coöperation of a few rich citizens, or have been paid for with money raised by taxation. With churches the case is different, and, although there are many examples of ecclesiastical structures erected at the expense of a single individual, the great majority have always been paid for by the contributions of a large number of people; while statues and monuments are commonly erected by the aid of a long subscription list; but it is safe to say that if the world had depended on taxation, or on voluntary contribution from a large number of citizens, for universities, hospitals and libraries it would possess very few of them. We are as much opposed as any one could be to the pauperizing of individuals by unwise charity, but it is a maxim of social science that a child is not pauperized, but, on the contrary, encouraged and strengthened for his future duties, by kindness, and the same rule holds good, to a great extent, of communities, which gladly and gratefully receive from individuals benefits which they are unable to provide for themselves, or which, in many cases, they do not understand the value of until they receive them. One writer on the subject mentions the case of a village which refused the gift of a library, because the citizens thought that the acceptance of the gift would "discourage self-reliance." This is commendable enough, but it may be fairly offset by the example of more than one small town, which has refused the gift of a library, on the ground that the citizens would have to hire a librarian, and buy coal to keep the building warm in winter, and that they did not wish to involve themselves in these expenses. A good library would do more, perhaps, than anything else to raise a community to a higher appreciation than this of the benefit of books; but it may be imagined that it would be a long time before such a village as this would change its disposition so far as to appropriate money to provide the library itself, as well as the cost of maintenance. In fact, the necessity for providing maintenance for the libraries and hospitals given or bequeathed to a municipality involves a sacrifice which, in itself, removes the pauperizing element from the gift. A boy who receives a present of a chest of tools, which he could not pay for out of his own small store of pocket-money, is happy in using the tools to make things for his friends, and gains in all good and manly qualities by doing so; and, in the same way, a community, through the sacrifices which it has to make in utilizing the gifts of benefactors, becomes more intelligent, more efficient, and less selfish. Americans have a reputation, of which they may well be proud, of being the most public-spirited people in the world; and it is a pity to do anything to discourage the habit of using one's superfluity for the advantage of other people which has done more than anything else to raise the world from barbarism to civilization, and which has still an ever-widening field before it.

THE Italian Government has done a wise thing in purchasing the Villa Borghese, just outside the walls of Rome, for conversion into a public park. Rome is now a great modern city, full of a poor and hardworking population, which has little opportunity for breathing fresh air, and the Borghese gardens, which are on high land, overlooking the city, will supply a ready-made park of the best character. The pictures and sculptures of the Villa Borghese were purchased by the Italian Government some time ago, and removed to a place of safety, and it may be hoped that the acquisition of the gardens will prove profitable to the Government, as well as to the poor people whom it has sought to benefit, through the increase in taxable value of property surrounding them.

RELATIVE COMPRESSIVE STRENGTH OF GRAVEL AND BROKEN-STONE CONCRETES.

THE tests outlined below were made for Messrs. Woodbury & Leighton, of Boston, in 1896. Although the writer had no connection with them professionally, the results obtained show so interesting a comparison between the compressive strength of concrete made with gravel and the strength of similarly proportioned concrete made with broken stone as to warrant the publication of a condensed summary.

The result of the tests which were made at the Watertown Arsenal shows that under the conditions described in full farther on concrete cubes 12 inches on a side, mixed in proportions of one part loose cement to 3 parts sand to 5 parts broken stone, are, after setting one or two months, 47 per cent stronger than similar cubes of concrete made with the same proportions of mixture, except that screened bank-gravel is substituted for the broken stone.

The experiments recorded are of special value on account of the lack of data bearing upon the subject in architectural and engineering literature. Formerly it was the general opinion that concrete made with gravel was stronger than similar concrete made with broken stone. Many architects and engineers still give an optional choice of these materials in their specifications, although the records of tests made are nearly all in favor of broken stone.

The best published results of tests bearing upon this subject are quoted in Baker's "*Masonry Construction.*" Tests made in Washington, D. C., by the Engineer Department are there referred to, and the conclusion is drawn from them that broken stone concrete is undoubtedly stronger than gravel-concrete, but that as the age of the concretes increases the difference between them becomes less marked. Tests made in France with coarse materials also favor the broken stone. Various proportions of materials were experimented upon there. With the proportions similar to those of the Woodbury & Leighton tests the percentage in the French tests in favor of broken stone is considerably smaller than in the former, being about 26 per cent. This difference is probably due to the difference in the materials used. As the proportion of cement in the concrete increases the relative difference in strength between broken-stone and gravel concrete decreases.

We will turn now to the tests which it is the object of this article to describe. The experiments were made by the contractors, Messrs. Woodbury & Leighton, to determine the best materials to use in the foundations of the new Houghton & Dutton Building on Pemberton Square, Boston. Twenty-six cubes of concrete measuring 12 inches on each edge were made, and after setting thirty or sixty days, were tested by the United States Ordnance Department at the Watertown Arsenal, Watertown, Mass. Sixteen of these tests were made to compare the strengths of concretes made with different proportions of materials, but the results from these will not be touched upon in this article. The quality of all Portland-cements has been gradually improving, even since so recent a date as 1896, and therefore the relative rather than the actual results of the tests are of value at the present time.

Three brands of Portland-cement were used, two of these being selected as the best European cements on the market and the third as the best American Portland-cement. The gravel used for the gravel-concrete was of rather small size. The largest stones did not run over 2 inches in diameter, and the average size was considerably less than this. The gravel was obtained from the excavation for the building to be erected, and it was screened over a quarter-inch-mesh screen to remove the sand. It was clean, containing practically no clay or loam. The sand from both the gravel and the broken-stone concrete was the same, consisting of ordinary clean coarse bank-sand, which was purchased by the contractors and hauled to the site of the building. The broken stone was of uniform size, averaging but little over one inch in dimensions, the dust and coarser stone having been screened out.

For measuring the materials, cubical boxes exactly 12 inches on each edge were used. The cement was measured in these boxes, loose. This fact must specially be noticed because the resulting concrete was less rich than it would have been if the cement had been measured by the packed barrel, as is customary on a great deal of construction work. The gravel and the stone were measured in the same cubic-foot boxes, and then spread out on a platform. The cement and sand, after measuring, were mixed dry and spread on the gravel, the water being added as the entire mass was mixed. One cubic foot of water was used to each cubic foot of cement. This gave a mixture which was fairly wet, quaking slightly when rammed. The proportions of the mixtures in each of the cases which we are now considering were one part loose Portland-cement, 3 parts sand, and 5 parts broken stone or gravel.

A cubic foot of loose cement as it was measured in the experiments is equivalent to .78 cubic feet packed cement as measured in a barrel direct from the manufacturers. This ratio was determined from calculations made and published by the writer based on tests made for the Boston Transit Commission in 1896.[2] If the proportions, therefore, in the Woodbury & Leighton tests had been expressed in terms of packed cement, we should have had one part packed cement to $3\frac{3}{4}$ parts sand to $6\frac{1}{4}$ parts broken stone or gravel.

After setting, the compressed surfaces of the cubes were faced with plaster-of-Paris. A part of the cubes were allowed to set thirty days, and a part sixty days. They were then tested by direct compression in the United States Testing-machine having a capacity of 800,000 pounds.

The results of the tests on the ten cubes used for a comparison of gravel and broken stone are tabulated in full below. The dimensions given are of interest chiefly in showing the accuracy with which the tests are conducted by the U. S. Army Ordnance Department. The figures are copied directly from the Department reports, with the insertion of the column of "Ratio of Strength of Broken-stone to Gravel Concrete," and the "Remarks." The "Number of Test" is simply a mark given by the Arsenal and has no reference to the quality of the cube. It will be noticed that the ratios are figured for each pair of tests, since the gravel and stone concretes are tabulated alternately, the two tests in each pair representing similar conditions throughout. The fact that the tests of foreign cements, which are designated as A and B, ran higher than those of American cement, called C, is of no special value at the present time, because, as has already been stated, the qualities of cements are being continually improved. As a matter of fact, also, subsequent tests made by Woodbury & Leighton at the Watertown Arsenal show that first-class American Portland-cement is equivalent in crushing strength, when made into concrete, to first-class foreign cement.

The ratio of strength of broken-stone concrete to gravel concrete has a final average in the table of 1.47. This means that under conditions similar to those in these experiments — that is, with mixture of one part loose cement to 3 parts sand to 3 parts stone or gravel — broken-stone concrete, after setting thirty or sixty days, will be 47 per cent stronger than concrete in similar proportions made with gravel for the aggregate. In making use of this result stress must be laid upon the fact that the tests were made under practical rather than laboratory conditions. The results from such tests are often more valuable than those made in a laboratory because the conditions are similar to those met with in actual building construction. The gravel was unwashed. If it had been made absolutely clean it is probable that the gravel-concretes would have shown greater strength and the ratio of strength of the two classes of concrete would have been smaller. As a matter of fact, however, the gravel used in building foundations, if it is fairly clean, unfortunately is apt to be washed so slightly that minute particles of dust and dirt remain on the stones. Hence, the tests in this respect correspond to practical conditions. The resultant ratio of the strength of broken-stone concrete to that of gravel-concrete obtained by these tests cannot be taken as exactly applicable to a comparison of concretes mixed with a larger or smaller proportion of cement. It is reasonable to assume

RELATIVE COMPRESSIVE STRENGTH OF GRAVEL AND BROKEN-STONE CONCRETES.

Number of Test.	Kind of Portland-cement.	Aggregate.	Dimensions. Height.	Dimensions. Compressed Surface.		Sectional Area.	First Crack.	Ultimate Strength. Total.	Ultimate Strength. Per Square Inch.	Ratio of Strength of Broken-stone to Gravel Concrete.	Remarks.
			Inches.	Inches.	Inches.	Square inches.	Pounds.	Pounds.	Pounds.		
9,446	A	Gravel.	12.05	12 10	12 02	145.44	167,300	167.300	1,150	1.46	Set 30 days.
9,445	A	Broken Stone.	12.20	12.08	12.00	144.96	243,400	243.400	1,679		Set 30 days.
9,469	B	Gravel.	12.51	12.15	12.07	146.65	216,200	216.200	1,474	0.99	Set 30 days.
9,470	B	Broken Stone.	12.70	11.90	12.05	143.39	209,200	209.200	1,459		Set 30 days.
9,467	C	Gravel.	12.40	12.05	11.97	144.24	127,700	127.700	885	1.96	Set 30 days.
9,468	C	Broken Stone.	12 11	12.28	12.10	148.59	257,400	257.400	1,732		Set 30 days.
9,382	A	Gravel.	12.40	12.04	12.06	145.20	238,600	238.600	1,643	1.49	Set 60 days.
9,381	A	Broken Stone.	12.06	12.02	12.03	144.60	324,000	352.300	2,443		Set 60 days.
9,500	C	Gravel.	12.37	12.05	12.13	146.17	180,200	180.200	1,233	1.47	Set 60 days.
9,501	C	Broken Stone.	12.58	12.05	12.08	145.56	251,000	264.500	1,817		Set 60 days.
									Average Ratio.....	1.47	

Note. — Proportions of all cubes were one part *loose* Portland-cement, 3 parts sand, 5 parts gravel or stone.

[2] See *Engineering News*, Vol. XLIV, p. 229.

that the relative difference in strength between broken-stone and gravel concretes will decrease as the quantity of cement used to the cubic yard decreases; that is, in a rich concrete it makes less difference whether broken stone or gravel is selected. This conclusion is borne out by the French tests mentioned above. In these the percentage of difference varies from 16 per cent to 30 per cent.

For practical purposes we may assume that the percentage of increased compressive strength of broken-stone concrete over gravel concrete runs approximately as is given in the following table. This table is based chiefly upon the French tests and the Woodbury & Leighton tests and applies to concrete which has set not more than a few weeks. In concrete which has set a longer time the ratios would probably be less.

Proportions of Concrete.			Ratio of Strength of Broken-stone to Gravel Concrete.
Parts Cement.	Parts Sand.	Parts Gravel or Stone.	
1	2	3	1.16 to 1.28
1	2	5	1.20 to 1.35
1	3	7	1.26 to 1.46
1	4	10	1.30 to 1.53

The fact that concrete made with broken stone is stronger than concrete made with gravel and having the same proportions of materials, does not necessarily prove that the use of gravel in concrete should be discontinued, nor that good specifications should always require broken stone. It does prove, however, that a very careful study of the matter should be made in any important undertaking. The economic side of the question will often determine that gravel is preferable, even although the strength of the resulting concrete is less. If great strength is required, it may be often cheaper to increase the proportion of cement in the mixture and use a gravel aggregate rather than to use the smaller quantity of cement with broken stone. On the other hand, it should be borne in mind that since broken-stone concrete is in general stronger than gravel concrete, a slightly higher cost per cubic yard of broken stone may often be more than balanced by the use of a less quantity of cement per cubic yard of concrete.

In deciding whether gravel or broken stone is the most economical, the fact should be noticed that since broken stone has in general a larger proportion of voids than gravel, a larger quantity of it as well as of cement and sand per cubic yard of concrete will be required than if gravel is used. This fact may not be obvious at first thought, and it is often disregarded in very careful estimates. A simple way of explaining it is that since a given quantity of broken stone has more voids, or spaces, than the same quantity of gravel, a larger proportion of mortar will be required to fill these voids, or spaces. If the proportions of the broken stone or gravel, the sand and the cement are definitely fixed with relation to each other, the mixture of the materials which have the greatest amount of solid matter will produce the largest quantity of concrete. As such small attention has been paid to this fact it may be worth while to illustrate it more fully with an example. We may assume for comparison that the broken stone has 50 per cent voids and that the gravel has 33 per cent voids. A mixture of 5 cubic feet of loose broken stone with, say, 3.5 cubic feet of mortar will give with perfect mixture 50 per cent of 5 cubic feet plus 3.5 cubic feet, or 6 cubic feet of concrete. On the other hand, 5 cubic feet of gravel mixed with 3.5 cubic feet of mortar will give 67 per cent of 5 cubic feet plus 3.5 cubic feet, or 6.8 cubic feet of concrete. In other words, in this assumed case the gravel materials will make over 10 per cent more concrete than the broken-stone materials, and conversely, approximately 10 per cent less in quantity of the gravel materials than of the broken-stone materials will be required to make a definite quantity of concrete.

For a small mass of concrete it may be cheaper to select materials and proportion them so richly that the result will be beyond question rather than to go to the expense of making tests. On large work, however, it is worth while, both on the score of economy and strength, to make special tests of the materials which are available in the locality where the job is situated. SANFORD E. THOMPSON.

CORROSION OF STEEL FRAMES OF BUILDINGS.[1]

THE constantly increasing use of steel as a structural member in modern buildings has led to many questions as to the permanency of the steel as sometimes used for this purpose. The examination of buildings 10 to 15 years old, when, during alterations, the steel framework has been exposed to view, reveals all stages and conditions of disintegration of the steel. So great has been the corrosion, even in this short time, in some cases, that a note of alarm has been sounded by some engineers most familiar with the subject. The use of steel beams and posts is of so recent date that no very exact deduction can be drawn as to the exact time required for a very serious or destructive loss of steel through corrosion; but surely, when a steel plate $\frac{1}{2}$ inch in thickness loses more than $\frac{1}{8}$ inch in 5 years, there arises a question as to the ability of the structure to last more than 25 years.

Some of the factors in the matter of corrosion of the steel we know; others we do not know, and cannot until after a lapse of some years.

There can be no question that moisture and carbon-dioxide are the active agents in causing much of the rusting of the steel. To what an extent the two are relatively responsible and in what measure they need renewal, to keep up the process, is uncertain. It has been held that the formation of a coat of rust upon the surface of steel was the beginning of a progressive action whereby the rust, or iron-oxide, acted as a continuous carrier of oxygen to the steel beneath. This process seems to require only moisture and atmospheric air containing carbon-dioxide to start it, but as to the depth of penetration of the process I know of no assignable maximum in any given time. It is extremely probable that in a comparatively dry place the process is extremely slow.

There can, of course, be no question as to the ease of access to the steel, in many cases, of both moisture and carbon-dioxide. When steel is bedded in the wall of the building, as is almost always the case, the changes in temperature from time to time, as well as the more or less constant difference in temperature between the two faces of the wall, tends to cause a condensation of moisture in the wall at different points. Further, the necessary carbon-dioxide is most plentiful in the large cities, while the steel-frame is most common.

When the walls of the building are of brick or stone, moisture and carbon-dioxide may usually enter at the joints and, to a greater or less extent, through the body of the stone or brick. Few stones are, however, porous to such an extent as to allow an appreciable penetration. Terra-cotta tile is of itself porous, and the existence of air-passages tends to increase the condensation of moisture and absorption by the terra-cotta and possible contact with the steel. Concrete, made of Portland-cement with sand and either cinders or stone, would seem to offer more protection to the steel than any of the materials just mentioned; yet, we hear from time to time of the loss, by corrosion, of steel bedded in concrete.

A study of the action of Portland-cement concrete on steel was begun under my direction by Mr. P. C. Pearson in December, 1901, and it is my purpose to report upon this and some later observations as a preliminary to more work of the same nature now under way.

It has been held by several engineers that the mere alkaline nature of Portland-cement was a sufficient guaranty of its protecting steel from rusting. There is, of course, good chemical reasoning for this, the familiar use of strong alkaline solution in boilers to prevent the formation of scale being based upon the same principle. This would seem to settle the matter once and for all, were it not a fact that steel bedded in concrete has corroded very rapidly, while other steel in a different concrete of the same kind of cement stands without change for 10 years or more.

The investigation was started not to find out that steel could not be protected by concrete or that it could be, for on that point we were sure, to start with, but we have tried to find a reason for occasional failure and to suggest a remedy.

An examination of several cases where expanded-metal had been embedded in concrete showed plainly that wherever the steel was exposed through cracking rusting began, even though the cracks were very fine. It would seem that the alkaline nature of the cement would be sufficient to prevent corrosive action occurring within a few hundredths of an inch on the moist surface of the steel, but such is not always the case.

To study the matter systematically, two brands of American Portland-cement (*Alpha* and *Lehigh*) were selected; two kinds of cinders, one from the Sugar Refinery, the other from the Boston and Albany locomotives; a sharp, clean beach-sand; and a hard, clean broken stone, the larger part being fragments of flint and trap-rock. Concretes were made up in bricks about 3″ x 3″ x 8″, with the steel specimens near the centre.

The following mixtures were tried at first; others will be reported on later: Neat cement; cement, one part to 3 of sand; one part of cement and 5 parts of broken stone; and one part of cement to 7 parts of cinders. All briquettes were made in duplicate with both cements. There were later made up briquettes of one part of cement to 2 parts of sand and 5 parts of cinders, and of one part cement to 2 of sand and 5 of crushed stone. The table below gives a summary of the mixtures: —

Alpha Cement.	Lehigh Cement.	Sand.	Stone.	Cinders.
1	0	0	0	0
0	1	0	0	0
1	0	3	0	0
0	1	3	0	0
1	0	0	5	0
0	1	0	5	0
1	0	2	5	0
0	1	2	5	0
1	0	0	0	7
0	1	0	0	7
1	0	2	0	7
0	1	2	0	7

It was hoped to vary the density, the porosity and the nature of the contact with the steel, as well as the chemical composition of the concretes. The cements were tested chemically and physically and found good. The cinders, when washed down with a hose stream and dried, tested distinctly alkaline, and analysis revealed very small amounts of sulphur. The stone and sand were thoroughly washed and clean. The ingredients were mixed dry in every case and, when wet, thoroughly mixed and tamped until wet on top.

[1] Report No. IV of the Insurance Engineering Experiment Station, Boston, Mass.

The cleaning of the steel was the most troublesome problem met with. It was necessary to scour the pieces, then pickle in hot dilute sulphuric acid, and finally dip into hot milk of lime. When cold, the lime was removed with a wire brush. This left the steel clean and bright, ready to be put into the test-bricks.

The specimens used were a mild-steel rod 6 inches long and $\frac{1}{4}$ inch in diameter, a piece of soft sheet-steel $6'' \times 1'' \times \frac{1}{32}''$ and a strip of expanded-metal $6'' \times 1''$, all three pieces being put in each brick. Since time would not permit of our exposing these specimens to natural conditions, we enclosed them in several large tin boxes, sealed tightly, and subjected one quarter of them to an atmosphere of steam, air and carbon-dioxide, and second quarter to air and steam, a third to air and carbon-dioxide, and a fourth stood upon the table of the room, with no special care as to their temperature or dryness. Of the entire number, about one-half were set in water for one day, the rest for 7 days, before sealing up.

At the end of 3 weeks the briquettes were carefully cut open and the steel examined and compared with specimens which had lain unprotected in each of the tin boxes.

Those specimens which were mixed of neat cement can be dismissed without discussion, for the protection was perfect. The steel was as bright as when put in.

The unprotected pieces were found to consist of rather more rust than steel. The steel was wrapped about pieces of uralite, to serve as a means of identifying it by number, the stamped numbers being nearly obliterated by the rust.

Of the remaining specimens, hardly one had escaped serious corrosion. The location of the rust-spot was invariably coincident with either a void in the concrete or a badly rusted cinder.

In the more porous mixtures, the steel was spotted with alternate bright and badly rusted areas, each clearly defined. In both the solid and the porous cinder-concretes, many rust-spots were found, except where the concrete had been mixed very wet, in which case the watery cement had coated nearly the whole of the steel, like a paint, and protected it.

Some briquettes made later of finely-ground cinders and cement, in varying proportions, when exposed to moisture and carbonic-acid, showed how effectually the presence of cement prevented rusting, even in a highly porous mass — one of cement to 10 of cinder, provided there were no cracks or crevices or distinct voids.

From the examination of these several hundred briquettes we were able to draw several conclusions: —

First. — Neat Portland-cement, even in thin layers, is an effective preventive of rusting.

Second. — Concretes, to be effective in preventing rust, must be dense and without voids or cracks. They should be mixed quite wet where applied to the metal.

Third. — The corrosion found in cinder-concrete is mainly due to the iron-oxide, or rust, in the cinders and *not* to the sulphur.

Fourth. — Cinder-concrete, if free from voids and well rammed when wet, is about as effective as stone-concrete in protecting steel.

Fifth. — It is of the utmost importance that the steel be clean when bedded in concrete. Scraping, pickling, a sand-blast and lime should be used, if necessary, to have the metal clean when built into a wall.

In the matter of paints for steel, there is a wide difference of opinion. I cannot believe that any of the paints of which I have any knowledge can compare with a wash or painting with cement. Moreover, if paint does disintegrate, it leaves a thin void next the steel, the worst possible condition. I examined some steel Z-bars not long ago, which were exposed in process of altering a building 5 years old. It was clear that the steel was rusty when painted and that moisture had penetrated through the paint, caused the rust to increase and split off the paint. This was a case where the steel was built into the brickwork with no attempt at any protection other than the paint.

It is, in my opinion, perfectly clear that the coating of all steelwork with cement before applying the concrete or tile or brick, as the case may be, is an absolute essential, if the formation of rust and consequent weakening of the steel is to be prevented. The thickness of the cement-layer need not be great, but it should be a continuous coating, without cracks. The steel should be perfectly clean; but if, as is often the case, the choice is between paint and rust which accumulates during construction, the paint is to be preferred.

Mr. Pearson suggested the use of Portland-cement in protecting the under side of railroad-bridges against rust and the blasting action of the gases and cinders from locomotives. I think this merits a careful trial.

It is intended to take up the study of paints as a protection for steel, and to study, as well, the action of corrosion with long lapses of time in the walls and buildings of the Experiment Station now about to be erected. The first fire-testing work will also be upon the tile, brick and concrete protection of steel from fire. Next we propose to study the effectiveness of the many kinds of "finish" for buildings. A small two-story house of refractory material, into which the finish to be tested can be built, is needed for this work, and already several materials are waiting to be tested. The kiln for testing floor-spans, beams and posts is to be about $15'' \times 20''$, and it will be heated by a battery of oil-burners well above the melting-point of cast-iron.

CHARLES L. NORTON.

LABOR-TRUSTS THE WORST.

ONE of the sanest and most logical presentations of the really important rights and principles involved in such labor disturbances as the anthracite-coal strike that the recent popular newspaper discussion has brought to light is that made by Mr. Robert S. Minot in the following communication addressed to the Boston *Transcript*: —

"TO THE EDITOR OF THE TRANSCRIPT: —

"The present anthracite-coal strike is prima facie the fault of the miners, because they voted to strike and struck, and the burden of proof is on them to show the contrary. A corresponding lockout by the operators would be prima facie their fault, but such lockouts do not occur and would not be tolerated if they did. There is no more reason for tolerating such a strike. A strike is an act of selfishness and brutality to the employer, to the striker's own wife and children, to the non-union worker, who works at the peril of his life, and to the public who suffers, particularly the poor, of the striker's own class.

"Whatever the sins of the operators, they do not often lockout, nor kill nor wound, except in lawful defence, nor starve their own families or others. They do not paralyze industry by mob-rule and criminal violence. The worst sin they are usually charged with is excessive prices, and that charge has never been proved, the retail dealers being now the worst offenders.

"The great trust-issue to-day is the labor-trusts. The others are comparatively unimportant and can be dealt with later. At most they make prices high, but the labor-trusts arrogate to themselves the right to paralyze production to the extent of their power. They have attempted to paralyze railroad-transportation, notably in 1877; street-railroad transportation, as in Brooklyn, Cleveland and Boston; building-operations, as in New York and Chicago; and now the production of coal, which strike means, if much prolonged, paralysis of all industry, transportation, education, and even destruction of life.

"There is always about the same routine. The vote to strike and the strike with little or no notice, selfish, ugly, brutal and destructive; the abuse and killing and wounding of non-union men; the destruction of employers' property and distress of the consumer and the public. If the labor-trusts had unlimited power what limit would there be to these results? They dread the law when properly enforced, and public opinion when it is not poisoned with false sentiment, and the exhaustion of their own means. Thus their power ends and so their strikes. They talk of equal rights and liberty, but deny them without justice or mercy to the 'scab,' whose life they take because he tries to earn his daily bread for himself, and his wife and little ones, for something less than union wages.

"If the 'scab' has no right to work for wages satisfactory to him, there certainly exists no right for union men to strike, but granting that there is the individual right to work, or to stop working, should not, must not, strikes such as this coal-strike, which if much prolonged may perhaps mean anarchy paralleled only by such historical instances of mob-rule as the French Revolution, be made by law criminal conspiracies, to be justly punished?

"The manual laborers are forming themselves into a striking-class distinct from the rest of the community. Misled by bad leaders, outvoted by their more radical members, they are ever prone in time of strikes to lawlessness and crime. What a terrible inheritance for their children!

"The working-classes are, like all other classes, made up of good, bad and indifferent individuals. It is only when the bad are in control that a whole class goes wrong. Their only salvation lies first in submission and obedience to the law of the land, and in true loyalty to their own families, to their contracts with their employers and to the public which depends on their continuous labor. The American public is over-patient and long-suffering, but once it sees clear, and is aroused and antagonized, no enemy is safe.

"No just or humane man or woman but knows that employers are too often selfish, hard and unjust, and wishes justice and consideration, humanity and kindness for every deserving workingman or woman, but every reasonable man sees that strikes are essentially civil war and rebellion on a minor scale, and when they break out in lawlessness, the first step, even for the striker's sake, is to restore law and order. Then there should be State boards of arbitration and conciliation, or courts of justice, to which all such disputes could be referred, like all other disputes. Why should the manual laborers not settle their disputes as the rest of us do? Public opinion will do the rest.

"There are deep lessons to be learned from this strike.

"*First.* — That the public interests vastly outweigh those of the operators or miners.

"*Second.* — That selfishness, antagonism, injustice and brutality are not practical qualities in the higher evolution of mankind.

"*Third.* — That the war-spirit, which Theodore Roosevelt, our President, has done somewhat to evoke and promote, is capable, in the midst of peace and unparalleled prosperity, of raising a hell too strenuous even for him, such as he has far more desire than power to quell.

"*Fourth.* — Universal suffrage is in peril in the North. It no longer exists in the South, the Negro having lost the ballot with scarcely a murmur of protest in the North, which fought the War of the Rebellion but forty years ago to give that ballot with freedom. It is just and necessary that habitual criminals should be disfranchised. A

period of disfranchisement would be a just punishment for any serious lawbreaking. Should such disfranchisement laws be enacted (and none but criminals or would-be criminals could well oppose them), those classes who were most lawless would suffer this penalty the most, and thus the element of 'politics' would gradually be somewhat eliminated in dealing with lawlessness of all kinds. To plunge lawlessness deeper into politics would be to leap out of the frying-pan into the fire. ROBERT S. MINOT.

"BOSTON, October 9, 1902."

FERRO-CONCRETE.

AT a meeting of the Society of Engineers held at the Royal United Service Institution, Whitehall, on Monday evening, a paper was read on "The Hennebique System of Ferro-Concrete Construction," by Mr. Augustus de Rohan Galbraith. The author stated that the originator of the principle was M. Joseph Monier, a Frenchman, and that it was first applied to the manufacture of slabs and pipes in ferro-cement. He then described the ferro-concrete system invented by M. Hennebique, a French engineer, which system has been widely introduced in practice in France, including the construction of a bridge of three arches at Chatellerault, 26 feet 3 inches wide, and having a centre-span of 172 feet and two side-spans of 135 feet each. This system is also being adopted in this country in various engineering-works, notably in connection with the Old Quay widening, and new dock-works of the London and Southwestern Railway Company at Southampton. The Hennebique principle consists in embedding in concrete straight and cranked iron or steel tension-bars and stirrups, to take the shearing-stresses, together with distance-pieces, the system being applicable to, and employed in, entire buildings from foundation to roof, inclusive. The piles used at Southampton are built up in vertical moulds, in which are placed long steel rods, which give the required strength. These are laced together with wire stirrups, and Portland-cement concrete of the best quality is filled into the moulds and rammed round the steel. After a month the pile is taken out of its mould and driven in position, much in the same way as timber piles are. The ram is exceptionally heavy, generally 30 cwt. The head of the pile is protected from injury by covering it with a hemlet, or iron case, filled with sawdust; a timber dolly is always used. The author then pointed out the care required in the selection and preparation of the materials, explaining that the usual proportions of the concrete were five to one, and giving the preference to Siemens-Martin steel over Bessemer steel, owing to the purer and more uniformly good quality of the former. He then dealt with the application of the system in general construction, giving the results of some tests of Hennebique beams with and without stirrups, which proved the superior strength of the former. He then stated that the results of experiments by Professors Bauschinger and Ritter showed that the adherence of iron to concrete was about 570 pounds per square inch. The coefficient of expansion and contraction of steel and concrete was found by M. Durand Claye to be identical up to the fifth decimal, giving the breaking strain of concrete as between 3,000 pounds and 4,000 pounds per square inch. The advantages of the system as regards fire-resistance were then illustrated by the light of some severe fire-tests carried out at Ghent, together with the results of a fire which occurred at a spinning-mill at St. Etienne, Belgium, which proved that ferro-concrete structures were perfectly fireproof. The author then gave the following examples of the cost of the Hennebique system as carried out in different structures: The Chatellerault Bridge, £18 12*s.* per lineal foot; a grain-warehouse at Plymouth, 4½*d.* per cubic foot of space; a flour-mill at Swansea, 4¼*d.* per cubic foot; grain-silos at Swansea, 6½*d.* per cubic foot, and some coal-hoppers at Portsmouth, 7¼*d.* per cubic foot. — *Building News.*

THE STRENGTH OF FERRO, OR ARMORED, CONCRETE.

A SERIES of valuable experiments has recently been carried out by a commission appointed by the Ministre des Travaux Publiques, with a view to ascertaining the precise *rôle* which the metal plays in armored-concrete construction. The results, as described by M. Considere in a communication to the Paris Académie des Sciences, are particularly interesting. The specimens used by the commission in the tests were generally in the form of bars 2 metres (2.187 yards) long, and had a cross-section 10 centimetres (3.9 inches) square. Each of these concrete bars was reënforced at the corners by four steel rods, having a total section of 113 square millimetres (.176 square inches). The concrete employed was made by mixing 300 kilogrammes (660.7 pounds) of Portland-cement with .800 cubic metres (28.25 cubic feet) of gravel, passing a 25-millimetre (.98 inch) screen, and .400 cubic metre (14.12 cubic feet) of sand, passing a 5-millimetre (.19 inch) screen. It was found that, in setting, the contraction of the concrete gave rise to an initial compression in the steel reënforcement amounting to 2,923.76 kilogrammes (2.87 tons) per square inch of the metal. The corresponding tensile forces simultaneously called forth on the concrete amounted to 33.57 kilogrammes (73.9 pounds) per square inch. Tested in tension it was found that the specimens stretched rapidly until the stress on the concrete was practically equal to the ordinary tensile strength of this material. From this point the tested bar stretched much less rapidly, and throughout this period the tensile stresses in the concrete remained constant, the whole increase of load being taken by the iron bar. It follows, therefore, that during this period the elastic modulus of the concrete was zero. In one case the test-bar was subjected to a load of 2,060 kilogrammes (2.2 tons), equivalent to a stress of 132.45 kilogrammes (291.7 pounds) per square inch of cross-section, under which the total expansion of the specimen was 6 millimetres (.024 inch). The reënforcing rods were then cut out, and the cross-shaped bar left was tested in cross-breaking, and in spite of being somewhat injured in the cutting out of the reënforcing bars, only failed under a calculated stress of 58 kilogrammes (127.7 pounds) per square inch. Summing up, M. Considere states that armored concrete submitted to tension acts in exactly the same manner as ordinary concrete, so long as the tensile stress does not exceed the usual breaking stress of ordinary concrete. Under higher stresses it will support without breaking extensions which, in the case of specimens hardened under water, have been as great as one five-hundredth of the total length; and, in the case of air-hardened concrete, have ranged between one eight-hundred-and-fiftieth, and one two-thousandth of the total length. When the ferro-concrete is stretched beyond the usual elastic range of ordinary concrete, the tensile stress on the concrete remains constant up to the ultimate breaking point, the whole of the additional load being taken up by the metal. When subjected to repeated tensile stresses, however, the fraction of the load carried by the metal tends to augment and that of the concrete to fall, until ultimately the working-stress on the concrete is only 70 per cent of its original value. If, finally, after a series of loadings and unloadings, the maximum load is raised 30 per cent, the concrete again exerts a tensile resistance equal to its primitive value. — *Stone Trades Journal.*

BOOKS AND PAPERS.

PROBABLY most people, if asked whether another book upon Rembrandt were necessary, would reply in the negative; and yet, in spite of numerous volumes, small and large, this little three-and-sixpenny book is not only right welcome, but it can be highly commended — as examiners say.[1] It is exactly what it pretends to be — a critical essay; not a mere bagful of facts strung together for the semi-ignorant. It supposes a certain amount of knowledge upon the subject, and an intimate acquaintance with the painter and his works. Moreover, it deals more with Rembrandt's drawings and engravings than with his pictures; but, in the author's own words, most of the details in the book "are drawn from Emile Michel's very full work on the subject." And yet the book is not only pleasant reading, but it fills up, in a small space, a certain void.

There are no reproductions of Rembrandt's pictures, because, says M. Bréal, bringing them down to the size of the book would be a betrayal. So the author determined to reproduce the painter's drawings and engravings from the collections in the British Museum, his object being to make people "love Rembrandt, not to judge him. If we could help to get Rembrandt's work looked at in some degree as Rembrandt knew how to look at a shell, a tree, an old woman or the veiled line of the horizon, our end will have been attained."

The author is hard upon critics and experts who condemn an etching as not Rembrandt's because it is clumsy or in bad taste. As he truly says, "In him there is no formula. He renews himself in every work and has no other care than that of rendering visible what he feels to be. He pursues this aim by any and every method, and when he touches it he stops; this is the explanation of those 'changes of manner' which we shall often remark in the same painting or the same etching."

And the people who "interpret" painters are also criticised, the folks who discover "philosophic intentions at which the artist, not having supposed himself so clever, would have a right to stand amazed" — systems of thought of which the painter was quite innocent — these people discourse eloquently upon the coarseness of some of the subjects of his pictures as being quite "unworthy of Rembrandt."

Whether M. Bréal is right in his defence of the painter's nude studies, or rather the Dutch *fraus* who sat for him, is questionable. Certainly, one cannot defend an ugly *ensemble* as one can an ugly face, which loses its ugliness by its expression, whereas the "altogether" has to depend upon line and color; and there is no reason why, if we condemn nudities which are only unclothed *hausfrauen*, we should be supposed to admire Greuze's *double entendres* and harmful imbecilities. However, the chapter upon this subject (IV) is well worth reading; much of it is perfectly true, and all the argument is well reasoned and worked out.

The translation is good and reflects credit upon Miss Clementina Black.

ARCHÆOLOGISTS interested in London should read "*Mediæval London*," [2] an excellently illustrated account of the city and its buildings. Many of the reproductions are from some drawings in the British Museum done by J. Wykeham Archer in 1841.

[1] "*Rembrandt: a Critical Essay.*" By Auguste Bréal. London: Duckworth & Co.

[2] "*Mediæval London.*" By William Benham, D.D., F.S.A., and Charles Welch, F.S.A. London: Seely & Co. Price, 7*s.* 6*d.*

They are wash drawings of places long since destroyed or restored beyond recognition, such as the crypt of a church in Aldgate, which had a fine vault. Those of the Tower are interesting, as showing the old seventeenth-century gabled houses which have been rebuilt as Victorian Norman.

Besides the above drawings are some exquisite pencil outlines by Antonio van der Wyngaerde, reproduced from the originals in the Bodleian Library, at Oxford. They are views of Westminster, the Strand, St. Paul's (the old cathedral), London Bridge, Billingsgate, the Tower, and Greenwich. Another, of Archer's, represents the Roman bath in the Strand, discovered in 1841. How many visitors to the metropolis have any idea that there is a Roman bath in London; indeed, how many Londoners, as they trudge along the Strand, are aware of the fact?

The letter-press is as good as the illustrations, which, of course, we should expect from two notable antiquaries, who are equally at home in relating historic facts as in discussing architecture.

AMONGST the many serial papers that have been first published in this journal and later republished in book-form, the latest now presents itself in the form of a reprint of Professor Edward S. Morse's journal-notes[1] made during a brief visit some years ago to some of the cities of China, at that time more or less open to the inspection of "foreign devils." The papers have too recently appeared in our own columns to require any extended notice of them, but it is worth while to explain that in preparing them for appearance in book-form Professor Morse has added other matter and illustrations, so that the book runs to over two hundred pages of lively, entertaining and instructive reading.

These journal-notes are to be looked on as merely the efforts of a man of science in his hours of relaxation and leisure; they are the plain, unvarnished records of personal impressions during a vacation-trip, jotted down on the spot without thought that they might later be laid before the public. If any one cares to know what Professor Morse's scientific work is he can find it in his important monograph on Brachiapods now in press; or get an equally good and more entertaining impression by examining his great catalogue of the Morse Collection of Japanese Pottery in the Boston Museum of Fine-Arts, one of the most perfect specimens of modern book-making that can be found, and an imposing monument of what scientific accuracy, patient thoroughness and true scholarship can accomplish.

IT has always seemed to us curious and somewhat inexplicable that English draughtsmen should have such a passion for drawing, over and over again in aimless repetition, to seemingly fruitless end, the examples of the heavy old oak furniture of the sixteenth and seventeenth centuries that are to be found in museums and cherished in the domestic circle as reminders of the discomfort endured by the people of those days, and proofs that the artistic perceptions of the designers were hardly on a par with the skill of the workmen who so vigorously carried out the crude ideas of the furniture-designer.

These cherished examples of old oak furniture are wonderfully easy to measure, as the forms are all geometrical and the parts not too small to be accurately figured with the use of a foot-measure, and the ornamentation is so crude that it can hardly be wronged by the most careless and inaccurate sketching. The fact that these heavy and clumsy articles were so well and strongly put together that they have lasted, in spite of hard use and neglect, for two or three hundred years and still are serviceable seems but a poor reason for encouraging furniture-makers in these days to put on the market articles which textually repeat these archaic and clumsy forms. And if the preparation and publication of elaborate measured drawings have not for their purpose the enabling the thoughtless designer or the rule-of-thumb mechanic to reconstruct the article in question, what is their purpose? They may be intended as warnings showing what to avoid; they can hardly be offered as suggestions which invite the designers of to-day to seek a means of refining and adapting their heavy clumsiness to the needs of to-day. Archæological veneration for the archaic work of elder times is respectable, but it is a virtue that the artist of to-day can leave uncultivated without losing caste.

Granted that another book of measured drawings of old English oak furniture were needed, we readily admit that Mr. Hurrell's book[2] fills the gap amply — even handsomely. He has shown all that there is to show, clearly, intelligently and intelligibly, but we question whether a large portion of his time has not been misspent, though we admit that this misgiving may not be shared by others.

The last forty of his one hundred and ten plates are more interesting than those which he devotes to furniture proper. Here we find collected measured drawings of miscellaneous details of the wood-worker's art of the period, panelling, ceilings, mantels, stair-rails, window-finish, etc. The forms are those proper to the period and the archaism of the decoration is essentially similar to that which is employed on the chairs, tables and chests shown in the earlier plates; but they are more interesting, more agreeable, more useful and usable, finally, because the eye accepts them as the mere expressions of form, and does not suggest to the mind heaviness and bodily discomfort as it does in the case of tables, chests and chairs which must be lifted and moved at the expense of a real muscular effort, or used and sat upon to the undergoing of real physical discomfort.

---

[2] "*Glimpses of China and Chinese Homes.*" By Edward S. Morse, formerly Professor of Zoölogy in the Imperial University, Tokyo, Japan. Author of "*Japanese Homes and Their Surroundings*," etc. Illustrated from sketches in the Author's Journal. Boston: Little, Brown & Co. 1902. Price $1.50

[1] "*Measured Drawings of Old Oak English Furniture*," also of some Remains of Architectural Woodwork, Plasterwork, Metalwork, Glazing, etc. By John Weymouth Hurrell. London: B. T. Batsford, 94 High Holborn, 1902. Imported by Charles Scribner's Sons, New York. Price $15.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITED STATES GOVERNMENT BUILDING: LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO. MR. JAMES KNOX TAYLOR, SUPERVISING ARCHITECT, WASHINGTON, D. C.

HOUSE OF JAMES MEANS, ESQ., NO. 191 BAY STATE ROAD, BOSTON, MASS. MESSRS. LITTLE & BROWNE, ARCHITECTS, BOSTON, MASS.

HOUSE AT DETROIT, MICH. MR. G. H. INGRAHAM, ARCHITECT, BOSTON, MASS.

HOUSE AT TORRINGTON, CONN. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

[Additional illustrations in the International Edition.]

THE ZABRISKIE MEMORIAL CHAPEL, NEWPORT, R. I. THE LATE FREDERICK CLARK WITHERS, ARCHITECT.

LOWER STORIES: NO. 191 BAY STATE ROAD, BOSTON, MASS. MESSRS. LITTLE & BROWNE, ARCHITECTS, BOSTON, MASS.

DOORWAYS, ETC., IN AIX, BOUCHES-DU-RHÔNE, FRANCE: — THE TOWER OF ST. AUGUSTIN; — HÔTEL D'ESPAGNE, COURS MIRABEAU; — DOOR IN THE RUE ESPARIAT.

DOORWAYS AT AIX, BOUCHES-DU-RHÔNE, FRANCE: — HÔTEL DE PANISSE, RUE E. DAVID; — HÔTEL D'AGUT, PLACE DES PRÉCHEURS.

THE old capital of Provence is certainly an imposing city. As one passes through the spacious *Cours*, with its trees and fountains, one is attracted by many fine sculptured doorways, brass knockers and finger-plates. And yet, not a single doorway can be attributed to any particular sculptor — there are no records in the city archives of the buildings, and the names of the craftsmen and sculptors who designed these beautiful doorways are as unknown as the troubadours' who sang at the Court of Kings René or Raymond. But, if artists are known by their works, Aix is a place to go to for the study of doorways; not half a dozen, but dozens, may be seen in all the streets. They are all still known by the names of the original owners, but whether by native artists or strangers, there is no evidence.

Two monuments in the Cathedral, of the fifteenth century, display grotesqueness rather than grace. The Eygosy Monument is interesting as an example of a most benevolent and soft-eyed *Tarasque*, that fearsome beast who, after devouring half the townsfolk of Tarascon, was subdued by S. Martha, and gave its name to the home of our much-respected Tartarin. But neither this nor the group of S. Martin — the beggar and the dog — are above the ordinary work of the period. They are Burgundian in character, whereas the doorways are Italian. The modelling of the caryatides of the Porte de Hôtel d'Espagnet, in the Cours Mirabeau, is superb. In the bas-relief above the door, Rue Espariat, we can trace the spirit of Prud'hon. So similar are these little winged Amours to some of Prud'hon's inventions, that one is almost tempted to assert that he must have designed them and the little people firing the cannon.

We are indebted to the courtesy of M. Heiricis for permission to reproduce his photographs.

STATION OF THE ELECTRIC ELEVATED AND UNDERGROUND RAILWAY, BERLIN, PRUSSIA. HERREN GRISEBACH & DINKLAGE, ARCHITECTS.

THIS plate is copied from *Blätter für Architektur*.

NOTES AND CLIPPINGS

THE NEW YORK STOCK EXCHANGE. — Next to the light, the two features of the room which it is of greatest importance should be as convenient as possible are the telephones and the annunciator. At the present time, Exchange members have about 500 telephones on the floor. In the old building they were placed everywhere that room could be

found for them. In the new structure, however, the greatest attention has been paid to placing the telephones in the most convenient possible location on the floor. The instruments are to be placed against a row of parallel partitions at the New Street end of the floor. They also encircle the great piers at that end which support the ceiling and floors above. An extraordinary amount of time and ingenuity was expended in planning these telephones so that every inch of space should be saved to the main floor and so that the clerks who operate the instruments should not be in the way of the brokers on the floor. To that end it has been arranged that these clerks shall enter the Exchange by their own door. They will not come into contact with floor-members except when it is necessary to the transaction of business. Second in importance only to the telephones is the annunciator. In the old Exchange Building the annunciator was a huge checker-board contrivance stretched across one wall. There were 1,200 squares — one for each member and officer — with a number on each. When a member was wanted at the telephone, his clerk would press a button, the flap covering his number would fall, and the member would run to his telephone to get the message. It is obvious that on a floor where perhaps 1,000 men are moving about it is not easy to locate any one, so that in the expeditious discharge of business these annunciators form an essential factor. In the new building there is a most ingenious contrivance. In each of the two side-walls of the room, other than those made by the windows, there is a great oblong checker-board, of 1,200 rectangles, each 9″ x 12″ in size. These rectangles are made of opaque glass and upon each of them a member's number is painted in distinct numerals. Behind each square are several incandescent electric-bulbs, with bulbs of different colors. Any one of the bulbs may be operated by the member's clerk. If the member is wanted at the telephone a red light may be turned on. If he is wanted at his office immediately, a green one. If some one wants him at the entrance, a blue globe. By alternating the colors, by duplicating flashes, and by other variations, it is obvious that an almost unlimited number of messages may be flashed to a member on the floor. In a business where seconds often count for everything, it will be pos sible to save a vast amount of time and money through this form of annunciator. One of them is fixed on each wall to save the members from looking one way all the time. Under the old system, the eyes of many members were injured from the necessity of continually looking at a single flapping checker-board. — *Ivy Lee in the World's Work.*

New Facts about Cliff-dwellers. — Dr. Henry M. Baum, President of the Records of the Past Society of Washington, D. C., has recently returned from a two months' visit to the ruins of the cliff-dwellers in Colorado, New Mexico, and Arizona, and will recommend that three groups of ruins — the Mesa Verda, near Mancos, Col.; the Chaco Cañon, in New Mexico; and the Cañon de Chelly, in the central part of Arizona — be set aside by Congress as national reserves. He is opposed to the project which is being agitated to set aside 480,000 acres which constitute Jaurito Park, near Española, in New Mexico. He will also urge Congress to order an archæological survey of the Southwest. He will return to Colorado next summer, and will head an expedition which will go over the territory just covered in a more comprehensive and detailed manner. He asserts that the cliff-dwellers lived at least 1,000 years ago, and, possibly, half a century earlier, while evidences exist of the habitations of many millions of people. In speaking of his trip, Dr. Baum said: "During my trip I do not think that I averaged 10 miles in any one of the cliff-dwellings districts where I did not come across some of the habitations in which these prehistoric people lived. I saw on my entire trip enough dwellings to accommodate 2,000,000 people. From what I saw I believe the country must have been inhabited by at least 7,000,000 persons. I am firmly convinced of one fact, and that is that the cliff-dwellers and the mesa and valley dwellers were all of a contemporaneous civilization which dates back before the heavy lava overflow in the Southwest. The pottery, stone implements, and skulls found in these three classes of ruins are all the same. It is quite evident that the vast civilization of the entire country was extinguished by a flow of lava, an eruption similar to that which recently occurred at Martinique. Those who were not killed directly by the lava-flow succumbed to the pestilence which followed. There were numerous evidences of the lava-flow throughout the entire region. In one instance I saw a vast irrigation-ditch filled with lava, and in New Mexico there were numerous dwellings covered with it." — *N. Y. Evening Post.*

Sea-water and Portland-cement Concrete. — A series of experiments, which are expected to extend over a period of 30 years, are about to be undertaken by the Prussian Government, in conjunction with a number of prominent cement-manufacturers, with a view to further elucidating the effect of sea-water on Portland-cement concrete. A number of large concrete blocks, made with cements of different compositions, are to be sunk in the sea off the coast of Sylt Island, and will be examined periodically. At the same time, briquettes of the mortar used and blocks of the concrete will be immersed in tanks on the land. Some of these tanks will contain fresh, and some salt, water. Both tensile and compressive tests of these briquettes and blocks will be made from time to time. The mortars used will be compounded so as to determine whether an addition of slags or strass improves the resistance of the cement to sea-water. It must be mentioned here that both high-limed and low-limed cements are to be used in these tests. — *Stone Trades' Journal.*

Valuable Find in Bœotia. — In a report to the Department of State, Charles S. Francis, United States Minister at Athens, Greece, announces that an unusually interesting archæological discovery has just been made in the northern part of Bœotia, in a plain of Chæronea, where the Greeks in 338 B. C. lost their independence by their defeat by Philip of Macedon. Mr. Francis says: "Dr. Soleriades had been sent there to examine the ruins of an ancient monument which the Greeks had erected on the spot where they had buried the fallen. In making a tentative examination he found a low tumulus on exactly the spot where Plutarch places the burial-place of the Macedonian soldiers of Philip. This tumulus he opened and found therein the remains of the Macedonian dead packed in layers. Most of the bones are charred, and the soil is mixed with ashes, showing that the bodies were cremated imperfectly. The importance of the discovery is that topographers will be able better to identify the sites of the battlefield, archæologists will expect to find Macedonian accoutrements, etc., and ethnologists, by studying the skulls (some well preserved) will be able to come to some conclusion regarding the racial affinities of the ancient Macedonians." — *Exchange.*

Purification of Water by Ozone. — "An examination of the results obtained in the purification of water by treatment with ozone has just been concluded by Drs. Ohlmuller and Prall, on behalf of the German Imperial Health Department," says the *Electrical Review.* "The apparatus used was capable of treating 10 cubic metres of water per hour. The water was sprayed through a rose to a bed of pebbles, beneath which ozonized air was forced under pressure. The down-flowing water thus came into very intimate contact with the up-flowing current of air. Bacteriological examinations were made both before and after treatment, while the effect of the process on color, clearness, and taste of the water was also observed. The bacteria which survived appeared to be of a specially resistant type, since their number was not reduced by prolonging the ozonizing action. It was found that the whole of the pathogenic bacteria were entirely destroyed by the process. None of the germs of cholera or typhus species survived. The process improves the color of the water and has no bad effect on the taste. The cost is given at about 5 cents per thousand gallons, one-third of which represents the actual cost of ozonizing."

Raising the Level of the Great Lakes. — The Government's determination to investigate a feasible plan of maintaining, if not lifting, the present level of the Great Lakes has caused a great deal of comment in marine circles of this city, and has aroused great enthusiasm at all other lake-ports, and progress of the movement will be watched with great interest. Congress has made financial provision for the undertaking, and it is understood that the experts who will carry on the investigation will be appointed at an early date. The question of the practicability of such a plan is not altogether new, but it appears that former experiments along those lines have never been carried far enough, because until very recently there has been ample depth of water at various ports and through the rivers and channels connecting them. During the last few years, however, vessel-men say lake-levels have dropped at an alarming rate, and the point is now reached where much fear is expressed for the future of commerce. The condition becomes more noticeable, marine interest contends, since the tendency of ship-building is toward the larger and deeper-draught craft. Experts claim that Lake Michigan has shown greater shrinkage, and old sailors bear out this statement. Some have claimed that the drainage-canal is largely to blame for the recent low water in Lake Michigan, although engineers of the latter scout the theory. It is understood, however, to be part of the Government's plan to investigate this particular condition. Many plans and suggestions are offered as reparatives. The one most talked of by practical marine men and engineers is that of building a dam at some point upon the lower waters of the Lakes, likely Lake Erie, near Niagara. Prominent engineers who have given the problem some study take the ground that it may be practicable to erect such a dam, and that the water could be raised fully 3 feet in Lake Erie thereby. The effect of such an elevation, it is held, would be felt in Lake Huron, but in lesser degree, the water being raised perhaps 2 feet. It is not obvious how such a plan would materially benefit Lake Michigan, and this point is causing much discussion. Some claim that the latter's level would be raised a foot by such an undertaking, although experts are aloof on that reasoning. Marine interests fear that the Government will be many years in getting down to actual work of relieving the condition of low water, for the project will cost many millions. It is argued that the saving made by the elimination of the necessity of dredging harbors and rivers, for which the Government lays out large sums every year, would be vast and in time would greatly offset the original expenditure. Marine interest maintains that something must be done or the next decade will see a revolution in the great inland waterways and their commerce. — *Chicago Inter Ocean.*

What is Bird's-eye Maple? — "What is bird's-eye maple?" That is a question which just now seems to be baffling not only people who use furniture made of this particular wood, but even woodworkers themselves. In a recent number of a woodworking-magazine an article was published which stated that bird's-eye maple was not a peculiar maple, but simply ordinary maple cut in a certain way. In a recent issue of the New York *Sun* that statement is refuted. It is there stated, on the authority of a woodworker, that bird's-eye maple and curly maple are both cut only from the logs of the rock-maple tree, *Acer saccharinum,* in which a beautiful lustrous grain is produced by the sinuous course of the fibres. This tree is not at all the common hard maple. It is a hard maple, but is full of little gnarls called eyes. Men looking for bird's-eye maple logs go through the standing timber and pick out the bird's-eye maple-trees, paying for them from $30 to $50 a thousand feet in the woods. Ordinary hard maple logs are worth only from $6 to $7 a thousand feet. It would be impossible to cut a piece of veneer with eyes in it from a common hard maple log, and it would be equally impossible to cut a bird's-eye maple-log, no matter how you cut it, so that it would not show the eyes." — *Scientific American.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, NOVEMBER 8, 1902 No. 1402

CONTENTS

SUMMARY: —

American Indifference to Art. — The Influence of photographic Processes on Artistic Development. — Death of Walter Cope, Architect. — Death of Frederic Tudor, Sanitary Engineer. — Professor Goodyear and the inclined Front of San Ambrogio, Genoa. — Other Cases of similar Inclination. — Experimental Reforestation in Minnesota. — The Château de Grignan. — The New President of the Metropolitan Museum of Art. . . . 41

NOTES ON IRON AND STEEL CONSTRUCTION. — XI. 43

THE DUTY OF THE ENGINEER. — I. 46

The Blair Building, Broad St. and Exchange Pl., New York, N. Y. — House on Woodlawn Ave., Chicago, Ill. — The Horace Mann School, Winnetka, Ill. — House at Portsmouth, R. I.

Additional: Competitive Designs for a Swedish Church. — Chapel of the Seminary, Issy, Seine, France. — Sections of the Same. — Union Trust Building, Providence, R. I. — Entrance to the Same. 47

NOTES AND CLIPPINGS. 48

A VERY interesting discussion has been going on in the New York *Evening Post* about American indifference to art. The *Evening Post* says, not without reason, that Americans look upon art with an intellectual, rather than an æsthetic eye, and it pleads for a greater appeal to the sense of beauty than is usual in our sculptured monuments, lamenting that our sculptors are obliged to spend their time in modelling the trousers and hats of their subjects, to meet the taste of their patrons, instead of endeavoring to charm spectators by some beautiful accessory. To artists and architects, familiar with the lovely and affecting French monuments, such as that to Regnault, in the School of Fine Arts, at Paris, or the Maupassant monument, in the Parc Monceau, or scores of others, it certainly seems as if something might be done to relieve the dryness of such portrait sculpture as we see everywhere in New York, and Boston, and Washington; but we are not sure that it is the public taste alone which is responsible for the devotion of our portrait statues to pantaloons. On the contrary, the attempts of Mr. St. Gaudens to add ideal accessories to his portraits have been warmly applauded by the American public, which is, we venture to say, quite ready to receive with favor further efforts in the same direction. Moreover, it should not be forgotten that it is possible to idealize a very simple portrait, if the sculptor has within himself the material for such idealization. No living sculptor, for example, is more successful in what we may call ideal accessories than Mercié, yet Mercié, in his Lee monument at Richmond, has been able to make a simple portrait, without accessories, unless the horse on which the great general sits can be called an accessory, as noble and inspiring as if he had surrounded it with representations of all the gods of Olympus. The *Evening Post* says, with truth, that "it would do no harm if our sculptors were occasionally asked for something more specifically sculpturesque than a portrait statue," but it does not follow that a great artist cannot show his greatness in portrait statues. He may not be able to reach perfection in portraiture, without that personal acquaintance with his subject which sculptors rarely possess; but he can make a perfect portrait of his ideal of his subject, and in the nobility of his ideal, and the power with which he expresses it in his figure, he may reach the highest flights of art.

IT may be worth inquiring whether the transformation which is going on in our periodical literature does not indicate an approaching artistic movement. Undoubtedly, the transformation is due to the invention of cheap processes of photographic reproduction, but the question of its origin does not affect the fact that where our predecessors were content with printed descriptions of interesting objects, we are supplied with accurate photographic representations of them. Every murderer, every great banker, every distinguished beauty, every interesting scene, is displayed before our eyes in endless half-tone prints, which, while they have little pretension to be artistic, are, at least, truthful; and it is not impossible that our habit of seeing accurate representations of all sorts of objects may be preparing us for a sense of that truthfulness which is the essence of art. Even now, the long necks and rosebud mouths of the idealized portraits of a hundred years ago look to us ridiculous in comparison with the actual human countenance as we see it drawn by the action of light on the pages of the daily newspapers; and the increase of our knowledge of the actual appearance of objects must make us more critical of artistic incapacity. Meanwhile, as if the publishers had observed a change in the public demand, the covers of magazines, and even the inside pages of Sunday newspapers, have begun to blaze with color. Undoubtedly, this is used, to a certain extent, to attract the eye of customers, unable to choose among the multitude of magazines offered for sale; but, even twenty years ago, a loud design in black and white would have been thought sufficient for a purpose for which the richest colors, combined with great skill, are now requisite. We are far from thinking that all the bright-colored magazine covers are artistically successful, but they are rapidly improving, and in them the coming generation is receiving a lesson which must have its effect sooner or later.

EVERY architect will regret the sudden death of Walter Cope, of Philadelphia, one of the most distinguished and popular members of the profession. It is something like twenty years since the firm of Cope & Stewardson came into note among architects all over the country for their beautiful and original work, as shown in the professional periodicals, and every year may be said to have added to their reputation. Some years ago, John Stewardson, the original Stewardson of the firm, was drowned while skating, to the deep regret of the community, as well as of the profession, but the firm name was continued, his brother taking his place, and has gained still more in note throughout the country. Mr. Cope was deeply interested in professional matters, and always ready to sacrifice himself in defence of the honor and rights of architects; and his loss will be felt among his brethren as that of a brave and wise defender of their interests, as well as of a beloved comrade.

MANY architects, particularly in Boston and New York, will hear with great regret of the death of Frederic Tudor, well known in the profession as an engineer for works of heating, ventilation and sanitation. Mr. Tudor belonged to an old and wealthy Boston family, and spent a considerable part of his boyhood abroad, returning from Paris to enter Harvard College. He was an earnest student of physics, and of science generally, and, on his graduation from college, entered immediately the service of the Boston and Maine Railroad, as a civil engineer. His health, even then, was delicate, and he found it necessary to give up a position in which he had already distinguished himself, and go back to Europe, where he interested himself in the movement for sanitation which was then at its height in England. On his return to this country, he undertook to put in practice the new ideas which he had received abroad, with improvements of his own, and, establishing himself as a consulting engineer in matters of heating, ventilation and drainage, he soon gained an extensive practice. Unfortunately for him, his enthusiasm for science led him to undertake contracts for work of the kind, in which, while he could better secure the execution of the work in the way in which he wanted it done, he was exposed to business hazards which he was hardly fitted by nature or experience to guard against, and, after some years of honorable effort, during which he introduced immense improvements, both in system and in detail, in the practice of heating and ventilation, he was forced into insolvency, with the loss of all his modest inherited fortune. He was, however, too valuable a man in his profession to be lost sight of, and his services as consulting engineer were soon in great demand. Under his advice, or from his designs, were installed the heating and ventilating system, to our mind unrivalled in the world, of the Metropolitan Opera House, in New York; the Pittsburgh Court House; the Boston Public Library; the Roxbury High School, and a great number of other buildings, public and private. He was, at the

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

same time, often called in consultation in regard to matters of drainage, upon which he was also an accomplished expert; and, in connection with his brother-in-law, he established a system of inspection and guaranty of plumbing and drainage which the profession has found of great service. Although he had suffered for many years from unmistakable pulmonary disease, his enthusiasm for his work kept him actively employed until within a few months, and it is said that even on his death-bed his mind was still busy with new inventions, which he was never to see carried out.

PROFESSOR GOODYEAR, of the Brooklyn Academy of Arts and Sciences, has been making an extremely interesting study of a Renaissance leaning façade, that of the church of S. Ambrogio, at Genoa, which was built in the latter part of the sixteenth century, probably about 1590, and shows, in the lower story of the front, an inclination forward of about eight inches, the story above being vertical. That the forward inclination was intentional is shown beyond question by the fact that the return pilasters show base-mouldings perfectly horizontal, which form an obtuse angle with the front edge of the pilaster, and an acute angle with the other edge. This observation of Professor Goodyear and his party, made in 1901, was subsequently confirmed by the official architect of the church, Signor De Andreis, who, it appeared, had noticed and measured the inclination ten years before, on the occasion of certain repairs and alterations.

THIS discovery is of peculiar value, as confirming the results of Professor Goodyear's study of the Cathedrals of Pisa and Ferrara, and the churches of S. Ambrogio, at Milan, S. Michele at Pavia, and Notre Dame at Paris, the fronts of all of which have the lower portion inclined forward, although, in most of them, the walls above are vertical. It is interesting, also, to learn that the lower tier of columns adorning the front of St. Mark's Church at Venice lean forward about three inches, in a height of something over nine feet, although the wall behind them is vertical, as are also the columns of the tier above; while the Porta della Carta, in the courtyard of the Palace of St. Mark, leans forward as a whole, the inclination being about eight inches. The Porta della Carta is a work of the early Renaissance, or, at least, of the Transition, so that this, with the much later front of S. Ambrogio at Genoa, indicates that the practice of curving or varying lines and surfaces to correct the effect of perspective, or to give certain artistic qualities, was not confined to the architects of the Middle Ages, but persisted, in a certain degree, far into the Renaissance period.

THE exact purpose of these variations from geometrical accuracy can only be conjectured. Undoubtedly, the practice of inclining forward the lower portion of the front of a building contributes to the peculiar advancing effect characteristic of many mediæval churches, but whether this effect was aimed at, or whether the walls were inclined for some other purpose, we cannot say. In the case of S. Ambrogio at Genoa, and of the Porta della Carta at Venice, it is probable that the inclination was given to allow the sculptured detail to be seen more fully, and with less change from foreshortening, just as the pinnacles and statues on the top of St. Mark's lean forward, the pinnacles overhanging more than six inches, and as friezes have been inclined forward, even down to our own time; but there is nothing in the lower portion of the front of Notre Dame, at Paris, which could be better seen in an inclined wall than in a vertical one, nor are the nine-foot columns of St. Mark's more favorably placed, in this respect, than they would be in a vertical position; so that we must, perhaps, conclude that the bulging effect was sought for its own sake, possibly as a correction of the flatness and dryness which the architects of the Middle Ages seem to have disliked so much.

THE State of Minnesota has a law under which any person or corporation owning bare, waste, sandy, rough or rocky lands, or denuded forest tracts, may convey such lands by deed to the State, for forestry purposes; and all lands so deeded are to be forever dedicated to forestry. The statute further provides that one-third of the revenue from such lands shall be divided between the State, county and town in which the forest is situated, in lieu of taxes, and the remaining two-thirds shall be paid to such public educational institution in the State as the grantor may designate. Under this law the late Governor John S. Pillsbury very generously conveyed to the State a tract of a thousand acres of land, once covered with forest, which would have been available for grazing, and even for farming, but which was also particularly well adapted for the experimental forestry which the donor desired to aid in carrying out. This tract is now in charge of the State Forestry Board, and will, it is hoped, form the nucleus of an extensive and profitable public forest. There are many other States in which a law similar to that of Minnesota might prove very useful. Millions of acres in the Eastern States, particularly, are nothing but a burden to their owners, who cannot profitably cultivate them, and whose attempts to plant them with trees, if they are enterprising enough to make any such attempts, are hampered by the smallness of the area with which they have to deal, and the indifference of their neighbors. The owners of these lands are too proud to abandon them, and, in consequence, continue to pay taxes on them, year after year, without the smallest prospect of ever receiving any return. Under the Minnesota law, such owners could relieve themselves of this burden, at the same time that they gained credit for themselves, by conveying the useless land to the State, and, incidentally, might confer great benefits on their posterity, or, rather, on the community of which their posterity would form a part; and it is conceivable that, by reserving some of the more available land out of a large tract, the remainder of which was conveyed to the State, the value of the portion reserved might ultimately be so much enhanced by the vicinity of a productive and well-kept forest that the operation would be a profitable one to all concerned.

THE French professional journals inform us that the Count de Castellane has bought from its former proprietor, an enthusiastic antiquarian, the celebrated Château de Grignan, long associated with the name of Madame de Sévigné, who spent there the last years of her life, with her daughter, Madame de Grignan. The husband of the latter, after his appointment as Governor of Provence, was obliged to maintain a style of living too magnificent for his comparatively modest fortune, and many of the letters of Madame de Sévigné, who was much attached to the husband of her beautiful daughter, relate to the construction of the château, a part of which dated from the time of Francis I, while the more modern portion was built under Louis XIV, from the designs of Mansard. As M. de Grignan found himself unable to carry out the plans of Mansard from his own resources, his two brothers, the Bishop of Carcassonne and the Bishop Coadjutor of Arles, came to the rescue, and supplied the funds required for the completion of the work. Unfortunately for the comfort of the people who lived in the house, the construction of the new portion, the "Bishops' Wing," as it is still called, went on very slowly, partly from the irregularity of payments, but still more on account of the caprices of the two Bishops, who made continual changes in the plans, "like little girls," as Madame de Sévigné says, who embroider on canvas, and "immediately pull out what they have done"; and the amiable Marquise did not hesitate to call vigorously upon the reverend gentlemen to finish the building, or, at least, to get it enclosed, so as to keep out the winds which rushed furiously through it. Her appeals seem to have been heard, for the "Bishops' Wing" was at last finished, and Madame de Sévigné lived for many years in the room which is still shown as hers, and, after her death, which took place in the château, was buried in the little church on the estate. All this took place nearly two hundred years ago, and the "Bishops' Wing" is now falling to decay, while the Francis I portion of the castle, nearly two hundred years older still, has almost disappeared; but the castle is so highly valued in France that it is officially classed as an "historic monument," and, although the Government was unable to purchase the property, it is hoped, undoubtedly with reason, that the new owners will respect, as far as possible, the associations of the place.

THE late Henry G. Marquand has been succeeded, as President of the Metropolitan Museum of Art, by Frederick W. Rhinelander, who has been for more than thirty years connected with the Museum as Trustee or Vice-President. Mr. Rhinelander is a connoisseur of great experience, and the active interest which he has taken in the affairs of the Museum, ever since its incorporation, makes it probable that the conservative but enlightened policy which has done so much for the Museum will be continued during his administration.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — XI.

THE steel-beam grillage-footings described in the previous article are exceedingly expensive on account of the great weight of steel required in their design. In the effort to obtain a spread footing that would possess the advantages of a steel-beam grillage-footing and at the same time be reasonable in cost, the reënforced concrete footing was studied and adopted to a considerable extent. This type of footing is shown in Figure 79 and consists of a monolithic concrete footing reënforced by tension-bars of metal as shown at *a* in the figure. The reason for thus reënforcing the concrete is due to the fact that while concrete has a great compressive strength, it offers comparatively little resistance to tension, so that in order to more nearly realize the compressive strength of concrete when a slab is subjected to transverse stress, the tensile resistance is supplied by the insertion of wire-netting, expanded-metal, twisted or corrugated rods of steel. The principal reason for using these forms of steel consists in the fact that the adhesion between the metallic reënforcement and the concrete must be sufficient to realize the tensile strength of the metal, that is, if the reënforcing-rods should slip and the joints between the concrete and the metal be thus destroyed, its efficiency as a reënforcing element would be materially lessened. The greatest use of reënforced concrete has previously existed in the construction of fireproof floors, arched bridges, concrete retaining-walls and similar structures. The slab of concrete reënforced with metal as shown in Figure 80 will deflect to a great extent before any signs of fracture or cracks can be detected on the under side of the slab, and it has been stated by some authorities that concrete slabs reënforced with metal do not crack until the point of rupture is nearly reached and also that the tensile-stress in the under surface of the slab and metallic rods does not decrease with excessive deflection and remains nearly constant until rupture occurs.

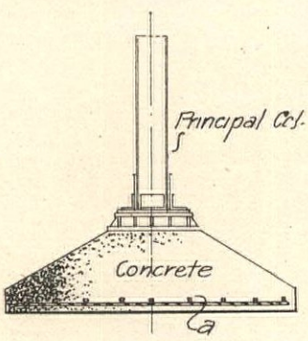


Fig. 79.

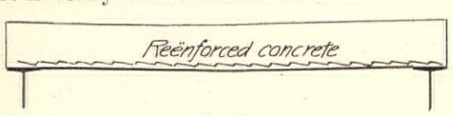


Fig. 80.

In reënforcing concrete that it may resist transverse stress, there have been employed several metallic forms. The common forms of metallic reënforcing bars are shown in Figures 81, 82, 83 and 84. In Figure 81 is designated a system of reenforcement which consists of heavy metallic wires crossed and recrossed until they practically form a woven-wire netting. This system of reënforcement is distinctly French. In Figure 82 is shown a twisted bar of iron and the introduction of this bar in concrete slabs is known as the Ransome system of concrete-construction. This bar is provided with a twist, the idea being that it will be held more tenaciously within the body of the concrete and no danger of slipping will exist. Another form of concrete reënforcement consists in the embedding of expanded-metal lathing in the under portion of the slab. The expanded-metal and the method of using it for this purpose is shown in Figure 83. The manufacturers of expanded-metal make a particularly extra heavy type of metal for this purpose. The metal may be obtained either of black or galvanized soft steel.

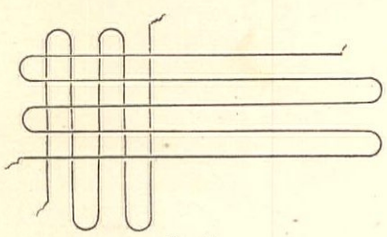


Fig. 81.

In Figure 84 is shown a type of rolled bar which has recently been introduced for the reënforcement of concrete under transverse-stress and which is admirably adapted for the purpose of building foundations. This bar is corrugated or ribbed in rolling and the angle made by the sides of the ribs with a plane at right angles to the axis of the bar is less than the angle of friction between the metal and the concrete. By this means the liability of the loss of strength in the reënforced slab, due to the breaking of the adhesion between the concrete and the metal, is necessarily eliminated. It is questionable, however, whether these corrugations or ribs need be provided in order that the adhesion between the concrete and metal bars be sufficient to realize their tensile strength. By experiment and tests plain bars of iron embedded in concrete have developed surprising adhesive resistance and many important works have been built abroad in which simple plain iron, round or square bars without twist or corrugations, have been used. Undoubtedly, the corrugations and the twists of the bar in the Ransome system are safeguards against any possible slipping and it may be that the efficiency of the plain bars used in the construction abroad depended entirely upon the fact that there was a great difference between the working-loads and the ultimate strength of the structure.

Fig. 82.

In order that one can intelligently design concrete foundations reënforced with steel rods, it is important that they should understand the present theory of the transverse strength of steel and concrete in combination. It is necessary in the design of spread footings that the transverse strength be known, for on account of the small area of the column base and the great area of the footing there is a tendency for a spread footing of shallow depth to fail by rupture adjacent to the perimeter of the column base. In the study of the transverse strength of steel and concrete in combination, it is requisite that one should have a clear understanding of the term *modulus of elasticity*.

It has been found by experiment and test that in all elastic materials subjected to stress and deformation the elongation under tension or the shortening by compression is directly proportional to the stress, within the elastic limit of the material. The *elastic limit* of the material is the load at which the deformation is not directly proportional to the *stress*. The *modulus of elasticity* in all formulas of the strength of materials is usually represented by E and $E=\frac{s}{d}$. In this formula $s=$ the stress, that is the pull or compression in pounds per square inch; $d=$ the proportional change or deformation per unit of length. The value of s is always equal to the amount of the force acting upon the material, divided by the area of the cross-section of the material, while d equals the total length of the member, bar or material in the direction of elongation or in the direction of deformation, divided by the amount of distortion or deformation, so that the value of E may be expressed by the formula

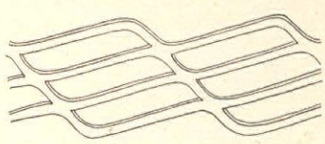


Fig. 83.

$$E=\frac{\frac{S}{A}}{\frac{l}{L}}=\frac{SL}{Al}.$$

In the application of this formula, assume that a force of 120,000 pounds applied to a structural-steel tension member, whose length is 120 inches and whose cross-section is 2 square inches, produces an elongation equal to .24 inches, the problem being to determine the modulus of elasticity of the steel. According to the formula

$$E=\frac{SL}{Al}$$

and by substitution it becomes $\frac{120{,}000\times 120}{2\times .24}=30{,}000{,}000$.

In composite beams of steel and concrete the nature of their section is not homogeneous and the steel does not possess the same elasticity as the concrete. While the modulus of elasticity of steel has been determined as between 28,000,000 or 30,000,000 pounds, this value of concrete has not been definitely ascertained. The value varies with the particular quality of the concrete employed and with its age. It is considered by good practice, however, that 1,000,000 is the safe value for the modulus of elasticity of Portland-cement concrete having aggregates of slag or broken stone, while cinder-concrete possesses far less

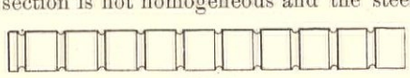


Fig. 84.

[1] Continued from No. 1395, page 95.

strength and probably its modulus of elasticity does not exceed 150,000. This latter concrete is mostly used for fireproof floor-construction and would never be used in the construction of foundation footings, so that it may be dropped from the discussion. In a composite beam it must be assumed that each material making up the section offers a resistance proportional to its rigidity, and it may likewise be stated that the rigidity of steel and concrete having like areas is proportional as the ratio existing between their moduli of elasticity, or, since the rigidity of the concrete is expressed by 1,000,000 and the steel by 28,000,000, that equal strain or deformation will be created in the concrete and steel when there is 28 square inches of concrete similarly placed with respect to the neutral axis as one square inch of steel. Therefore, in order to determine the resistance to transverse stress of a beam combining steel and concrete, it is reasonable to *redraw* the section of the beam and substitute, on a line coincident with the steel bars, an area of concrete which will be equal to them in resistance. This will be made clear by reference to Figure 85, which shows a concrete footing reënforced with four steel

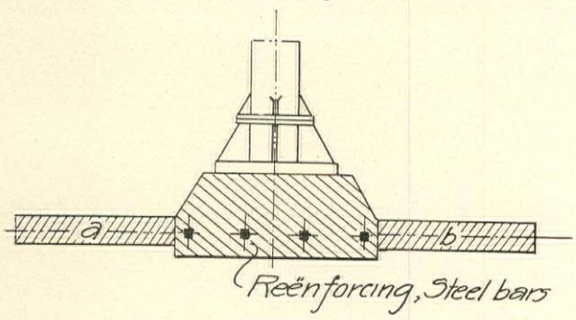


Fig. 85.

bars. Considering that the steel bars are omitted and substituting in their stead the areas a and b, which are equal in extent to 28 times the sectional area of the bars, the neutral axis may be determined by calculation, and found where shown in the figure. The moment-of-inertia may then be calculated and the strength of the footing or beam determined when the *beam* fails by cracking on the tension side, by the formula $M_1 = \frac{s\,I}{c}$. In this formula M_1 = the moment-of-resistance of the section, s = the safe unit fibre-stress, that is, the safe unit tensile-stress of the concrete, I = the moment-of-inertia of the new section and c = the least distance from the neutral axis of the extreme fibres on the tension side.

When the bending-moment is known it is usually necessary to determine the compressive stress at the top of the concrete and the tensile stress at the bottom of the concrete and these values, which may be represented by Sc and St respectively, are obtained from the following formulas: —

$$Sc = \frac{M c_1}{I} = S\left\{\frac{1 + m - 2\frac{d_1}{d}}{1 + m + 12\frac{{d_1}^2}{d^2}}\right\}$$

$$St = \frac{M c_2}{I} = S\left\{\frac{1 + m + 2\frac{d_1}{d}}{1 + m + 12\frac{{d_1}^2}{d^2}}\right\}$$

In the above formulas the value of the algebraic symbols are as given in the following notation: —

I = moment-of-inertia of the altered cross-section.

S = stress in the extreme fibres of the unenforced concrete section which may be found by the formula $\frac{6\,M}{b\,d^2}$

E_s = modulus of elasticity of the steel reënforcing rods or bars.

E_c = modulus of elasticity of the concrete in the beam section.

b = width of the concrete beam.

d = height.

a = sectional area of the steel reënforcing bar or rod.

A = sectional area of the concrete substituted instead of the steel reënforcing members, which is equal to $a\frac{E_s}{E_c}$

d_1 = distance from central axis of the original beam-section to the centre of the reënforcing bar.

d_2 = distance from central axis of the original beam-section to the new neutral axis of the altered cross-section.

c_1 = distance from the neutral axis to the tension side of the beam.

c_2 = distance from the neutral axis to the compression side of the beam.

m = ratio of the longitudinal rigidity existing between the concrete beam and the steel reënforcing member imbedded within its lower portion; this value of m is equal to $\frac{b\,d}{a} \times \frac{E_c}{E_s}$

The values of d_2, c_1, c_2 and I may readily be worked out by the following formulas: —

$$d_2 = \frac{l}{m+1}$$

$$c_1 = \frac{d}{2} - d_2$$

$$c_2 = \frac{d}{2} + d_2$$

$$I = b\,d\left(\frac{d^2}{12} + \frac{l^2}{1+m}\right)$$

In connection with this subject of combination concrete and steel beams, and concrete spread-footings reënforced with steel tension members, the Expanded Metal Fireproofing Company gives valuable data in their several publications. Especially interesting is an article entitled "Discussion of the Strength of Steel-Concrete Beams," which is an abstract from a paper presented to the American Society of Civil Engineers, by A. L. Johnson. This discussion, since it seems one of the most reasonable and practical, is given in connection with this article, and reads as follows: —

"It is a peculiar fact that, though plain concrete beams will deflect but very little before rupture on the tension side, the same concrete when it has a metal reënforcement on this side will deflect enormously before any cracks are noticed, even if the under side is plastered to a perfectly smooth surface. Some authors go so far as to say that the concrete does not crack when armed with metal until near rupture, and that it retains a nearly constant tensile strength after exceeding the distortion at which it should have failed.

It is possible that this is true, but it is a position not as yet generally accepted amongst engineers. As a matter of fact, however, it makes very little difference, as it unquestionably is a fact that the cracks, if present, are so small as to be invisible, and no injury to the construction could result from their presence. If present, we should have to omit from our formula for the moment-of-resistance of the cross-section the moment due to the tension in the concrete below the neutral axis. But as the tensile strength of the concrete is very small anyway, the omission of this element would not materially alter our design.

For this reason, and to avoid a quibble over an unimportant matter, we have assumed that the concrete below the neutral axis is inoperative.

We also assume that very little more than the elastic limit strength of the metal will be developed at the maximum load-carrying capacity of the construction. In testing it is possible to break the metal entirely in two, but this does not occur until after the maximum load-carrying capacity has been passed.

In bar construction therefore, we should use as high a steel as consistent with sufficient ductility, in which case we can readily obtain an elastic limit of from 40,000 to 45,000 pounds per square inch, which would allow us to use about 50,000 in our formula. In the expanded-metal the elastic limit has been much increased by the stretching of the metal in expanding so that the foregoing figure is not far wrong for this material also.

With these values the assumption is made that the modulus of elasticity of the steel is practically constant up to the maximum load-carrying capacity of the construction.

This condition, however, does not hold for the concrete. The maximum load-carrying capacity will occur when the extreme fibre-stress on the concrete is equal to its ultimate compressive strength, assuming that there is enough steel used to develop it. When this occurs the stress diagram will be as shown above the neutral axis in Figure 86. On this diagram the total stress Pc, equal to the area of the shaded portion, is

about 25 per cent greater than the area between the lines $o\,n$ and $o\,s$. This is true either for rock or cinder concrete. Also the modulus of elasticity as represented by the tangent of the angle $n\,o\,s$ is only $\frac{2}{3}$ in rock concrete, and $\frac{1}{2}$ in cinder concrete,

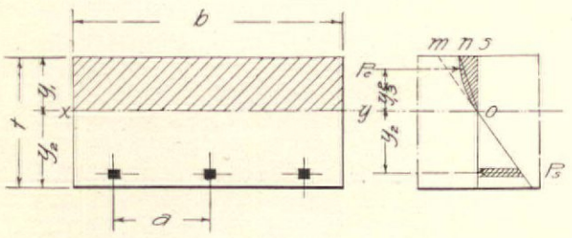


Fig. 86.

as much as the original modulus shown by the tangent of the angle $n\,o\,s$.

With these preliminary conditions disposed of, we are ready to derive the formulas for the moment-of-resistance of steel-concrete slabs.

Let,

E_s = modulus of elasticity of steel in pounds per square inch.

E_c = modulus of elasticity of concrete in compression in pounds per square inch.

F = elastic limit of steel in pounds per square inch.

f_c = compressive strength of concrete in pounds per square inch.

b = width of section considered in inches.

t = thickness of section considered in inches.

d = spacing of bars in inches.

a^2 = area of bars in square inches.

$\frac{a^2}{d}$ = amount of metal per inch of width in square inches.

For No. 16 Ga. 2½-inch mesh expanded-metal this = .012 square inches.

For No. 10 Ga. 3-inch mesh expanded-metal this = .016 square inches.

Mo = moment of ultimate resistance of cross-section in inch-pounds for failure in tension.

M^1o = moment of ultimate resistance of cross-section in inch-pounds for failure in compression.

M = bending-moment of external forces in inch-pounds.

W = total load on beam in pounds.

w = load per square foot uniformly distributed in pounds.

P_s = total stress on metal in width b.

P_c = total stress on concrete in width b.

e_1 = unit elongation of extreme fibre in compression.

e_2 = unit elongation of steel.

We will use the following values for the constants, based upon the best information obtainable. The values for concrete are taken from a very thorough discussion of this subject in the September number of the *Journal of Engineering Societies* for 1900, page 145. They are for an age of one month, this being the age at which tests are usually called for.

E_s = 30,000,000.

E_c = for rock-concrete 1 : 3 : 6, 4,800,000.
for cinder-concrete 1 : 3 : 6, 1,000,000.

F = 50,000.

f_c = for rock-concrete 1 : 3 : 6, 1,500.
= for cinder-concrete 1 : 3 : 6, 600.

b = 12 inches.

d^2 = for ½-inch-square corrugated bars = 0.21 square inches.

The general discussion for single-span beams on knife-edge supports is as follows : —

Total area of metal in width $b = \frac{a^2 b}{d}$.

Total stress on metal, $P_s = \frac{F a^2 b}{d}$.

Then the strain, or stretch, of the metal is $e_2 = \frac{F}{E_s}$,

and $P_s = E_s e_2 \frac{a^2 b}{d}$.

On the compression side we have

$e_1 = e_2 \frac{y_1}{y_2}$, and the resulting stress is

$f_c = e_1 \frac{2 E_c}{3}$ for rock-concrete, and

$= e_1 \frac{E_c}{2}$ for cinder-concrete

$= e_2 \frac{y_1}{y_2} \frac{2 E_c}{3}$ for rock-concrete, and

$= e_2 \frac{y_1}{y_2} \frac{E_c}{2}$ for cinder-concrete.

Also,

$P_c = \frac{5}{4} f_c \frac{b}{2} y_1$ for both rock and cinder concretes.

Then

$P_c = \frac{5\, b\, y_1^2\, e_2\, E_c}{12\, y_2}$ for rock-concrete

$= \frac{5\, b\, y_1^2\, e_2\, E_c}{16\, y^2}$ for cinder-concrete.

But

$P_c = P_s$.

Hence,

$E_s e_2 \frac{a^2 b}{d} = \frac{5\, b\, y_1^2\, e_2\, E_c}{12\, y_2}$ for rock-concrete;

from which

$$y_1^2 = \frac{12\, a^2\, y_2\, E_s}{5\, d\, E_c} \text{ for rock-concrete.} \qquad (1)$$

Also,

$E_s e_2 \frac{a^2 b}{d} = \frac{5\, b\, y_1^2\, e_2\, E_c}{16\, y_2}$ for cinder-concrete;

from which

$$y_1^2 = \frac{16\, a^2\, y_2\, E_s}{5\, d\, E_c} \text{ for cinder-concrete.} \qquad (2)$$

For the moments-of-resistance of the cross-section we have

$$Mo = P_s y_2 + \frac{2 P_c y_1}{3} = \frac{P_s}{3}(3 y_2 + 2 y_1) = \frac{F a^2 b}{3 d}(3 y_2 + 2 y_1) \qquad (3)$$

$$M^1o = P_s y_2 + \frac{2 P_c y_1}{3} = \frac{P_c}{3}(3 y_2 + 2 y_1) = \frac{5\, b\, f_c\, y_1}{24}(3 y_2 + 2 y_1) \qquad (4)$$

We also have another equation between y_1 and y_2, viz : —

$t = y_1 + y_2 + \frac{1}{4}''$ for expanded-metal construction, (5)

and

$= y_1 + y_2 + \frac{3}{4}''$ for ½-inch corrugated bar construction. (6)

For beams of equal strength in tension and compression, the following is derived : —

Here Mo becomes equal to M^1o, or

$$\frac{F a^2 b}{3 d} = \frac{5\, b\, f_c\, y_1}{24}, \text{ or } y_1 = \frac{24\, F a^2}{15\, f_c\, d} = \frac{1.6\, F a^2}{f_c\, d} \qquad (7)$$

Combining (1) and (7) and (2) and (7) we have for rock-concrete,

$y_2 = \frac{y_1^2\, 5\, d\, E_c}{12\, a^2\, E_s}$ where $d = \frac{1.6\, F a^2}{f_c\, y_1}$

$= \frac{2\, F\, E_c}{3\, f_c\, E_s} y_1$ for rock-concrete. (8)

In the same way we get

$y_2 = \frac{F\, E_c}{2 f_c\, E_s} y_1$ for cinder-concrete. (9)

Introducing these values in (4) we have

$$Mo = M^1o = \left[\frac{5\, b\, F\, E_c}{12\, E_s} + \frac{5\, b\, f_c}{12}\right] y_1^2 \text{ for rock-concrete,} \qquad (10)$$

and

$$= \left[\frac{5\, b\, F\, E_c}{16\, E_s} + \frac{5\, b\, f_c}{12}\right] y_1^2 \text{ for cinder-concrete.} \qquad (11)$$

In designing slabs for a given bending-moment, M, the following appertains : —

For this case we have $Mo = M^1o = M$, and using value of M^1o given in (10) and (11) we have

$$y_1 = \pm \sqrt{\frac{M}{\frac{5\, b\, F\, E_c}{12\, E_s} + \frac{5\, b\, f_c}{12}}} \text{ for rock-concrete,} \qquad (12)$$

and

$$= \pm \sqrt{\frac{M}{\frac{5\, b\, F\, E_c}{16\, E_s} + \frac{5\, b\, f_c}{12}}} \text{ for cinder-concrete.} \qquad (13)$$

In the following Table the values of these functions for rock

and cinder concrete and for three different kinds of metal reenforcement are given. The values for the constants are as previously given.

VALUES OF FUNCTIONS IN FORMULAS FOR CROSS-BENDING OF STEEL-CONCRETE SLABS WHICH ARE SIMPLY SUPPORTED AT THE ENDS, USING VALUES FOR CONSTANTS AS GIVEN.

Kind of Metal employed.	Kind of Concrete.	General Values for Rock and Cinder Concrete.			Special Values when $M\,o = M^1\,o$.		
		$y_1{}^2$	$M\,o$	$M^1\,o$	y_1	y_2	$M\,o = M^1\,o$
½″ square Corrugated Bar.	Cinder-concrete 1:3:6 machine-mixed.	$\frac{20.16\,y_2}{d}$	$\frac{42{,}000}{d}(3\,y_2+2\,y_1)$	$1{,}500\,y_1\,(3\,y_2+2\,y_1)$	$\frac{28}{d}$	$1.385\,y_1$	$9{,}250\,y_1{}^2$
No. 16 Ga. 2½″ mesh Expanded-metal.		$1.15\,y_2$	$2{,}400\,(3\,y_2+2\,y_1)$	$1{,}500\,y_1\,(3\,y_2+2\,y_1)$	$1.60''$ $t=$	$2.23''$ $4.08''$	23,736 inch-pounds.
No. 10 Ga. 3″ mesh Expanded-metal.		$1.53\,y_2$	$3{,}200\,(3\,y_2+2\,y_1)$	$1{,}500\,y_1\,(3\,y_2+2\,y_1)$	$2.13''$ $t=$	$2.96''$ $5.34''$	41,982 inch-pounds.
½″ square Corrugated Bars.	Rock-concrete 1:3:6 machine-mixed.	$\frac{3.15\,y_2}{d}$	$\frac{42.000}{d}(3\,y_2+2\,y_1)$	$3{,}750\,y_1\,(3\,y_2+2\,y_1)$	$\frac{11.2}{d}$	$3.56\,y_1$	$47{,}500\,y_1{}^2$
No. 16 Ga. 2½″ mesh Expanded-metal.		$.18\,y_2$	$2{,}400\,(3\,y_2+2\,y_1)$	$3{,}750\,y_1\,(3\,y_2+2\,y_1)$	$.64''$ $t=$	$2.28''$ $3.17''$	19,488 inch-pounds.
No. 10 Ga. 3″ mesh Expanded-metal.		$.24\,y_2$	$3{,}200\,(3\,y_2+2\,y_1)$	$3{,}750\,y_1\,(3\,y_2+2\,y_1)$	$.85''$ $t=$	$3.01''$ $4.11''$	34,200 inch-pounds.

M. M. SLOAN.

[To be continued.]

THE DUTY OF THE ENGINEER.[1]—I.

WE have been for some time waiting for a chance to publish this discussion since, *cæteris paribus*, the ethical and educational considerations which control the engineering and architectural professions should be nearly identical, and it is very satisfactory to find here the proof that in the main they are so identical.

THE discussion this evening is intended, I understand, to develop a somewhat informal expression of opinion on the duties of the engineer in his several professional relations. I have been asked to say a few words on his duty to himself and to his profession. A moment's consideration will show that the two are indeed inseparable. There is nothing an engineer can do in furthering the interests of his profession by which he, himself, does not become the chief gainer. The contrary is no less true. He who is remiss in discharging his duties to his profession to the measure of his ability fails to a like extent in promoting his own interests. This is, indeed, but another way of saying that every successful effort in doing something by which the profession profits adds to the professional capital of the doer, and hence redounds directly to his personal advantage. There was a time in the earlier days of engineering when its few followers had to rely upon their private note-books, containing the accumulated store of their professional knowledge, as their chief source of information. And it was natural that data gathered by the slow, laborious process of personal experience, when other means were almost wholly lacking, should have been more or less jealously guarded. In those days engineering-societies had no existence, or next to none, and engineering-literature was of the crudest kind. Just as every trade and every business had its "secrets," engineering had its mysteries. To-day such "secrets" are seldom kept, not because men have grown more altruistic, but chiefly because they recognize that it does not pay to keep them. The accumulation and diffusion of knowledge along all lines is now proceeding at such a tremendous rate that the greatest possible contribution on the part of any single individual sinks into comparative insignificance. The gain that may accrue to him by selfishly withholding the results of his personal experience and observation is apt to be as nothing compared with the professional prestige he may derive from their publication through the widest channels. It is true that there are not wanting men to-day in our profession, as in every other, who, like the sponge, absorb what comes within their narrow reach and yield it only upon pressure. Happily, such men constitute an insignificant minority. Nor can there be a doubt that they are themselves the chief sufferers of their narrow-mindedness. We can all bear ready testimony to the cheerful willingness with which engineers in general are wont to place the results of their experience at the free disposal of their colleagues, both on private and public occasions. By some this policy is carried so far that they refrain from patenting devices that show good possibilities of profitable development. While no one can reasonably condemn him who seeks to reap the largest legitimate returns from ideas that are his own, we cannot refrain from applauding the high-mindedness that prompts a contrary course. And such examples are by no means so infrequent that they must be classed as rare exceptions.

Coming now to the direct question before us — the duties of the engineer to himself and his profession — which, as I have said, are really one and the same, the answer can be put, I think, in very few words. His duty is to hold high professional ideals and to make a conscious and conscientious effort to apply them to himself, as nearly as may be, in all his professional relations. To consider in any great detail just what these ideals should be and how they are to be observed under various contingencies would be equivalent to formulating a code of professional ethics. To attempt even an outline of such a code would be alike presumptuous and unprofitable. Since engineers are human, they may be broadly classified, ethically, under two headings. First, that overwhelming majority who would not stoop to unprofessional practices under any consideration; and, second, that small but ever-present minority who strive persistently for momentary advantage without a nice regard to the means by which it is to be attained, or for the rights of others. Men whose moral sense is so warped will never be redeemed by any artificial code that may be prescribed for their professional guidance. Their natural tendencies may perhaps be somewhat curved, or at least their influence for evil partly negatived, by giving the widest publicity to their practices whenever they assume a form that plainly warrants public exposure. Our leading engineering-journals have not hesitated, in extreme instances, to assume this duty.

It has been recommended from time to time that the engineering-societies should exercise a sharp restraint upon unprofessional conduct through their power of expulsion. Experience has shown, however, that this power is rarely or never brought into play; not only because the chief offenders are apt to be beyond their pale of membership; but because it is human nature for men to condemn silently rather than accuse openly. . . .

Unlike the physician, the engineer cannot conceal downright incompetency behind an agreeable personality, nor can he count on burying his mistakes. Some years ago there appeared in one of our foremost magazines[2] two papers, in which the question "Can lawyers be honest?" was ably presented from opposite points of view. While I would yield to none in my tribute of respect to the legal profession in its best estate, it is a comforting thought that in our own profession the very suggestion of such a heading, much less a serious argument upon the question, were inconceivable. In claiming this, we need not withhold the admission that the engineer has probably less temptation to depart from normal, every-day

[1] Extracts from a paper by Edgar Marburg, read at the Engineers' Club, of Philadelphia, and published in the *Proceedings* of the same.

[2] The *North American Review*, Vol. cliii, 1891, pp. 194 and 504.

standards of rectitude than has his brother of the law. Nor does he need to defend his practices by professional traditions not always easily reconcilable with such plain standards. . . .

When we come to consider the relatively small number of engineers in independent practic , there is more ground for reasonable differences of opinion. Whatever tests of competency may be applied, however, it would seem that they should rather take the form of a searching inquiry into the professional record of the candidate than an examination. While it is easy to set an examination that will exclude incompetent men, it is exceedingly difficult to prevent the exclusion of men who are really competent. The tendency of an examination is almost unavoidably to set a premium on memory rather than general intellectual fitness; on so-called book-learning rather than on practical experience and plain common-sense.

Let us turn aside a little further to consider for a moment an interesting matter, not strictly germane to the subject. The question is not infrequently asked, Why does the profession of engineering not receive the same measure of recognition by the general public that is so freely accorded to the so-called learned professions: theology, medicine and law?

While public sentiment is doubtless growing more enlightened, one is still often amazed at the vague notions betrayed by men of good average information concerning the functions of the engineer. Even at this day a civil-engineer is not uncommonly looked upon as a surveyor who occasionally turns his hand to other duties. A college graduate, speaking of civil-engineering, once said to me, with blunt frankness, that the prospect of spending one's life looking through the small end of a telescope seemed to him singularly unattractive. I replied that I thought all men who regarded engineering in that light would doubtless share his feelings.

The mechanical-engineer is scarcely better off. The average intelligent layman looks upon him as some kind of a cross between an inventor, a machinist and a stationary-engineer; but is sorely puzzled to identify him more closely. As for the electrical-engineer, he is popularly regarded as an inventor, pure and simple, whose talents may sometimes elevate him to the so-called "wizard" class.

Quite recently I was asked by a doctor of philosophy to explain the distinction between a civil and a mechanical engineer. I could not resist the temptation to reply at first that there was none, since every mechanical-engineer was really a civil-engineer, the one being the specific, the other the generic designation. I was honest enough to add that the mechanical-engineers were somewhat inclined to object to this classification.

A highly cultivated woman whose son proposed to study engineering recently observed in my presence that she could not account for what she called her son's peculiar mechanical bent; that the male members of the family had been professional men for generations; but that her son seemed determined to become a mechanical-engineer and she supposed she would have to let him have his way. She came to this conclusion in a tone of such helpless resignation as to remind me forcibly of the luckless hen who had hatched out an ugly duckling.

These instances are believed to be fairly characteristic in showing the imperfect understanding and the inadequate appreciation of the public at large of engineering as a profession. Admitting the fact, what are the reasons? If we turn to our engineering-schools — which, by the way, are seldom counted with the professional schools — we find their average standard of admission and the prescribed length and breadth of their courses distinctly in advance of those in medicine and law; nor are they, to say the least, less difficult. Speaking generally, there is no course in a university held in more wholesome respect by the student body, or more carefully shunned by those in quest of "soft snap" courses, than those in engineering. And it may be claimed with equal confidence that there is no profession which makes more exacting demands upon its followers, and in which high honors are more difficult of attainment or, on the whole, more deservingly bestowed. Clearly the answer, whatever it may be, must be sought in other quarters.

To say that engineering as a profession is yet in its swaddling-clothes is true if the reckoning be in years. If gauged, however, by the more rational standard of achievements, we find it has attained to giant's stature. We rest our claim to professional recognition upon the fact that engineering has its basis no longer in empiricism, but in science. The justice, and, in fact, the meaning, of that claim, however patent to ourselves, can appeal but dimly to the layman. His appreciation of our work is apt to be in proportion to its outward magnitude or striking novelty. To him the building of a railway means little more than an amount of digging and filling, the laying of ties and rails, and the dumping of ballast. The construction of water-supply and sewerage systems seems to consist essentially of the opening and closing of ditches for the reception of simple pipes, whose sizes, he vaguely conjectures, are fixed somehow by experience. As for the building of pavements and ordinary roadways, or canals, dykes and levees, evidently nothing could be much easier. In short, it is impossible for him to fully grasp the idea that there is scarcely a detail of processes apparently so simple that has not been made the subject of profound scientific study and that is not undergoing constant change in the light of new inventions and discoveries.

Another reason which militates strongly against us in shaping the popular estimate of our profession lies in the fact that the overwhelming majority of engineers are employed for fixed hours at fixed salaries. The fewest number stand in direct personal relations with their clients. This circumstance is, indeed, an unfortunate one for us from more than one point-of-view.

It must be conceded, too, that the public appreciation of a profession and of its individual members stands in a not altogether remote relation to their earning capacity. To maintain a high social position on a slender income is becoming increasingly difficult and, in our larger communities, is well-nigh impossible. We cannot blind ourselves to the fact that the maximum earning-capacity of engineers is insignificant compared with that of the most successful men in other professions. When life or liberty, character or fortune is at stake, there is no haggling over fees. Retired statesmen find apparently little difficulty in speedily accumulating snug fortunes in legal practice. I need not add that engineering offers no such possibilities. In engineering a net professional income exceeding $10,000 per annum is, indeed, a very rare exception. To be sure, I am leaving out of consideration that large number of men who owe their success in kindred vocations more or less directly to their engineering training; and those to whom this training has served as a stepping-stone to salaried positions of high responsibility and trust, in lines not strictly technical. . . .

The one-sidedness of our development is due in a measure to causes normal and unavoidable. But in a larger measure the fault is one for which we are at least passively responsible. The tendency toward narrowness is apparent even among students pursuing engineering-courses. Studies not strictly technical are too often looked upon as useless and slighted accordingly. This tendency is deplorable in a double sense. Not only because the purely cultural studies occupy at best a scant place in the curriculum, but because there is probably no profession which affords less opportunity for recovering such lost ground in after-life. It is a rule, rather than an exception, that engineering-students are not able to write creditable English upon graduation. We are painfully aware, too, that this fault is not confined to the fledglings of our profession. Let me quote the testimony of the Past-President of the American Society of Civil Engineers, in his own words, as spoken at the last annual convention of that Society, in London: "For two years, during my period of holding the office of Vice-President, I was a member of the Publication Committee, and I was surprised at the manner in which some papers were presented. What I am saying now is of course not for general publication, but simply for the members of our Society. . . . If some of the papers presented to that Publication Committee by men who stand high in our profession had been presented by pupils of a high school, they would never have been permitted to receive consideration." Those of us who have served in a similar capacity can appreciate the justice of these strictures, humiliating as they are. And it is better that they should be emphasized too strongly than that they should be glossed over.

We owe it to ourselves and to our profession to recognize the danger to which I have alluded, — the danger of unsymmetric development, — and to make well-directed and persistent efforts to escape its consequences. We should seek to keep in intelligent touch with the world of men and affairs. We should strive to take a generous interest in all higher lines of human endeavor. We should try to cultivate a taste for art, an appreciation of good literature, and of all else that makes for culture and refinement. We should have a proper regard, too, for social forms and usages, by estimating them at their true worth. To despise, or to affect to despise, the amenities of life is almost as censurable as to make them the chief aim and end of one's existence.

[To be continued.]

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE BLAIR BUILDING, BROAD ST. AND EXCHANGE PL., NEW YORK, N. Y. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

HOUSE ON WOODLAWN AVE., CHICAGO, ILL. MR. W. A. OTIS, ARCHITECT, CHICAGO, ILL.

THE HORACE MANN SCHOOL, WINNETKA, ILL. MR. W. A. OTIS, ARCHITECT, CHICAGO, ILL.

HOUSE OF BRADFORD NORMAN, ESQ., PORTSMOUTH, R. I. MESSRS. WINSLOW & BIGELOW, ARCHITECTS, BOSTON, MASS.

[Additional illustrations in the International Edition.]

COMPETITIVE DESIGNS FOR A SWEDISH CHURCH.

THESE sketches are copied from *Teknisk Tidskrift*.

CHAPEL OF THE SEMINARY, ISSY, SEINE, FRANCE. M. EDOUARD BERARD, ARCHITECT.

THESE illustrations are copied from *l'Architecture.*

SECTIONS OF THE SAME.

UNION TRUST BUILDING, PROVIDENCE, R. I. MESSRS. STONE, CARPENTER & WILLSON, ARCHITECTS, PROVIDENCE, R. I.

ENTRANCE TO THE SAME.

NOTES & CLIPPINGS

RESTORING THE HALL IN THE NUREMBERG RATHHAUS. — It has been decided to restore the great hall in the Rathhaus, or City-hall, at Nuremberg. This hall, which belongs to an older part of the building, erected in 1522, is decorated with frescos by Dürer, representing the triumphal procession of the Emperor Maximilian, town musicians and minstrels, and the discomfiture of Midas; it also contains remarkable stained glass by Hirschvogel. On the central buttress is represented an execution by the guillotine, dated 1522, which shows that those terrible instruments date far back of the French Revolution. The cartoons now to be restored were already touched up and altered in the seventeenth century, and German artists are doubtful whether much will remain of Dürer's work. The German art-journals which discuss this question also note the recent discovery at Frankfort, in the Church of St. Leonard, of a curious fresco containing a large face of Christ; experts place the date some time in the thirteenth century. Also in the Church of the Holy Spirit at Nuremberg there has been brought to light, back of an old plaster partition, several curious paintings of the fifteenth century representing the death of the Virgin, a meeting of the twelve Apostles, and a colossal St. Christopher. The church dates from 1390. — *N. Y. Evening Post.*

A STRIKE THAT IS "STILL ON." — "Forty years ago, when I was a boy and living at Concord, N. H.," said a guest at a Detroit hotel the other evening, "a man built a factory for the manufacture of sleds and wheelbarrows. It was a water-power concern, and the cost was about $20,000. When the forty employés had turned out about a hundred wheelbarrows a difference of opinion arose between them and the boss. I don't exactly remember what it was, but it was stated over and over again in after years that it would have made a difference of less than a dollar a week to either side. The owner wouldn't give in, and the men stood firm, small as the matter was, and a strike took place — perhaps the first in New Hampshire. When the men walked out the owner said to them: 'Very well; you can go. Remember, however, that I'll see this factory rot to the ground before I'll give in.' They answered that they would starve before they would yield, and so the factory was locked up, and time went on. A score of attempts were made to arbitrate, but without avail. The owner grew old and gray, and the hands died or disappeared, and 5 years ago, by personal investigation I found that only the owner and one of the strikers were left alive in Concord. Knowing them both, I had a talk with them about the strike, but both were still firm. I was in Concord again a month ago. The factory was still closed and ready to tumble down, and the last of the strikers was dead. The owner was hobbling about the streets of the town on crutches, with only a few months' life left, when I said to him: 'Well, Uncle Billy, I learn that Job Sabins is dead. As he was the last of the strikers you'll open the factory again, won't you?' 'No, I won't!' he bluntly replied. 'Being as I've been a blanked fool for forty years, I'm going to keep it up the rest of my days.'" — *Detroit Free Press.*

THE ETHICS OF ELECTRICAL ENGINEERING PRACTICE. — The Council of the Institution of Electrical Engineers (England) have circulated among the clerks of some of the principal counties and boroughs the following suggestions with regard to the standard of professional etiquette which ought to be observed by, and expected from, consulting electrical-engineers: "1. No consulting-engineer should solicit employment as consulting-engineer verbally, by letter, by agent paid by commission or otherwise, or by any other means. 2. No consulting-engineer should answer advertisements for consulting-engineers. 3. No consulting-engineer should advertise for employment. 4. No consulting-engineer should pay by commission or otherwise any one who introduces clients. 5. No consulting-engineer should receive trade or other discount, or surreptitious commissions or allowances in connection with any work which he superintends. 6. A consulting-engineer who is also directly or indirectly interested in any contracting or manufacturing business should inform his client in writing what his connection is with such contractor." These are excellent rules, and it will of course be the more easy for electrical-engineers to act up to them if public bodies are informed in regard to them. — *The Builder.*

THE MUSEE FALGUIERE. — Mme. Falguière, the widow of the distinguished artist, has added one more to the numerous museums in Paris — the Musée Falguière. This is at the deceased artist's studio, No. 68 Rue d'Assas, where Falguière worked during the last years of his life; and it is well furnished with all the remaining works of the artist, both in painting and in sculpture; in the latter section will be found a complete series of sketches for all Falguière's work, from the Gambetta monument to the "Triomphe de la Révolution." — *The Athenæum.*

A SIMPLE TEST FOR SLATE. — Professor Brunner, of Lausanne, stated recently that the following method of testing slate would be found to be both simple and effective: A piece of slate measuring 7 centimetres by 3 centimetres (2.7" x 1.18") is hung by a cotton thread inside a glass vessel so as to be just above, but not touching, 100 cubic centimetres (.176 or $\frac{1}{10}$ pint) of water saturated with sulphurous acid. The vessel is closed up, and if bad the slate in a few days becomes exfoliated; if it remains compact, it will become very friable and spongy. Good slate will remain unaffected from 4 to 6 weeks, whilst superior slate has no sign of decomposition after several months. The rapid decomposition of bad slate is due to the presence of iron pyrites, carbonate of lime, and magnesia. The iron pyrites under the action of the sulphurous acid gives off sulphuric acid, which decomposes the other minerals, while the carbonate of lime under the influence of humid air and carbonic-acid gas is transformed into the soluble bicarbonate of lime. — *Stone Trades' Journal.*

A QUEER PIPE-ORGAN. — One of the queerest musical instruments that was ever built was put up in a house nearly as queer. Both were made at the instigation of Joris Karl Huysmans, a Frenchman who has been called the greatest living literary sensualist. The house was built to represent the bottom of the sea. Inside were all manner of strange seaweeds, mosses and grasses. The tinting of the walls was of pale green, with the most delicate shades of browns and pinks. Outside all the windows were great tanks of fish of nearly every known variety, for in this way he determined to keep up the illusion in which he took so much delight. But in the strange domicile that he had erected for himself there was nothing that was so in keeping with the sensualistic character of the man as his musical instrument. Charmed with a song as he was with color, it must yet mean something tangible to him. To this end he authorized the building of an immense pipe-organ, every pipe of which was connected with one central tube, which could be held in his mouth as he played. The organ was so constructed that each pipe was in communication with a butt of liqueurs, so that with each note he touched he was thrilled not alone by the sound but by a drop or two of the most choice wine. The beautiful strains of Mendelssohn's "Spring Song" or the Lohengrin "Wedding March" meant to him a double harmony; for as the beautiful chords filled his seahouse with melody he was receiving a dulcet minstrelsy of benedictine, chartreuse, crême de menthe and many other equally epicurean drinks with each wizardlike touch of the white keys. The man who conceived this weird idea has run the gamut of all human emotions to find something new and has just entered as a lay brother in a Benedictine order of monks. After living a life full of all that makes it worth living to such a man, he has given it up for a daily routine of religious observances that begin with mass at 6 o'clock, private prayers at 7, matins at 8.30, and so on through all the day, with nones, compline and vespers, and manual in all the lapses of time. This last freak seems even more eccentric than all that has gone before in his career of extravagances and eccentricities. — *Boston Transcript.*

THE MUMMIFYING PROPERTIES OF A CHURCH VAULT. — Bremen Cathedral is no less renowned than the Rathhaus, and also because of its cellar, which contains, not wine, but mummies. This cellar, known as the Bleikeller, or lead cellar, because there the lead for the roof was melted, was accidently found to have the property of preserving bodies from decay. The story of how this discovery was made speaks volumes as to the life and customs of the Bremers who lived four centuries ago. It seems that one of the workmen fell from the roof and was killed. His body being in the way of other workmen, was pushed into this cellar along with a lot of other rubbish and then forgotton, until long afterward some one found it quite mummified. And the fellow-citizens of this unfortunate workman — or was he not rather fortunate, considering the fame he had achieved, quite outrivalling that of any mere bridge-jumper? — thought the Black Death a scourge sent by God to punish them for their sins, never dreaming it was for their filth that they were being chastised. Since that time a number of bodies have been placed in the cellar. A Swedish general of the Thirty Years' War and his faithful aide-de-camp, an English duchess, and others who during their lifetime enjoyed the homage of the world, now lie there arrayed in simple loin-cloths, and any stranger who will pay the sacristan a few pfennigs may rap on their august chests or peer into the holes which vandals have knocked in the sides of two of their number. Only one sarcophagus still shields its inmate from these indignities, and that because members of his family have bestirred themselves to keep it inviolate. — *J. W. Ihlder in N. Y. Evening Post.*

THE GENEVA SCHOOL OF INDUSTRIAL ART. — The Paris *Bulletin de l'Art* gives some details of the success which has attended the work of the Geneva School of Industrial Art, an institution founded in 1875, to remedy the distress brought about by the falling off of exports in watches to the United States. Classes in enamelling and bronzework were taught by experts brought from Paris, and wood and stone carving and china-making were taught by Germans from Bavaria and Saxony, to such good purpose that the exports in all these specialties have become of large importance. Practical work goes hand-in-hand with the study of art principles, the needy student being enabled to sell the wares he makes in the school-shops. In a Government report just published the municipal authorities of Geneva testify to the value of the work done by the school, in furnishing the local factories not only with competent designers, but with a class of shop-leaders who inspire the rank and file of the workers with art enthusiasm. The course followed yearly by several hundred pupils includes drawing, modelling, iron-forging, lock-making, china-making, engraving, wood and stone carving, printing, etc. At the Paris Exhibition of 1900 the jury, in awarding a prize of honor, also offered its congratulations to the directors of the school.

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, NOVEMBER 15, 1902 No. 1403

CONTENTS

SUMMARY: —

The Suggested Changes in the United States Capitol. — The Rebuilding of the Tower of St. Mark. — A Means of Stimulating Improvement in Urban Architecture. — The Evil done by Shade-trees in Cities. — Underground Freight-traffic in Chicago. — Underground Tunnels as Sculpture Galleries. — The Coming-of-Age of the Architectural School of Columbia University. — An Italian Fountain for the New York Zoölogical Park. 49

NOTES ON IRON AND STEEL CONSTRUCTION. — XII. 51

THE DUTY OF THE ENGINEER. — II. 53

THE PHILADELPHIA CITY-HALL. 55

ILLUSTRATIONS: —

Cottage of J. B. Fallon, Esq., Jamaica Plain, Mass. — Design for Beacon Boulevard Hotel, Brookline, Mass. — The Park Valley Inn.

Additional: House of E. J. Berwind, Esq., Newport, R. I. — Entrance Pavilion to the same House. — A Competitive Design for the Boston Athenæum, Boston, Mass. — Sections of the Same. 56

COMMUNICATION: —

The late Walter Cope. 56

NOTES AND CLIPPINGS. 56

THE annual report of the Architect of the Capitol at Washington brings forward in detail the plan already described in these pages, for extending the east part of the central portion of the Capitol to the line of the Senate and House wings, building the extension of marble, like the wings, and leaving the present sandstone walls of the central portion to form the walls of interior courts; so that the whole eastern front will be of marble. This, as is known, was the scheme advocated long ago by Dr. Walter. Mr. Woods, the present Superintendent of the Capitol, urges that Dr. Walter's plans should be faithfully carried out, and we are sure that the profession generally will support him in this recommendation. In regard to the Rotunda, Mr. Woods gives some interesting information. It seems that Dr. Walter, for a long time before his death, felt that the great height of the dome required some support in the Rotunda more visibly adequate to its work than the existing pilasters, and he proposed that columns should be set in front of the pilasters, carrying a marble cornice, and that the walls, which are now of sandstone, painted white, should be lined with marble. This would make a radical change in the appearance of the Rotunda, while the columns would encroach considerably upon its floor-space; and Mr. Woods is inclined to think that it would be most judicious, now that the Rotunda has become associated with so many important events in American history, not to make any material change in it, but to remove the paint which was put on twenty-five years ago, so as to expose the sandstone of the walls, and to change slightly the proportions of the pilasters. This treatment would restore the original solidity of effect of the stonework, without changing materially the aspect of the room.

THE plans for the restoration, or, rather, the rebuilding, of the Venetian Campanile are now complete, and the work will begin as soon as the subscriptions and appropriations reach the sum of four hundred thousand dollars, only one-half of which has yet been raised. Under the skilful direction of the Commander Boni, it has been decided to rebuild from the very foundation, increasing the area of piling to double its present dimensions, and correspondingly extending the footings of the tower. Above ground, the masonry will be laid in cement. The accounts say that puzzolana is to be used, but it seems more likely that ordinary Portland cement will be employed. The old materials are to be used over again, so far as they are uninjured, and the form of the old tower is to be retained in the new one, with the important exception that the vault over the staircase, or sloping platform which took the place of a staircase, is to be replaced by a construction of iron girders. It will be remembered that, at the time of the fall, we suggested that the thrust of this continuous vault, acting through the whole height of the tower upon the brickwork of the walls, without other resistance than that afforded by the weight of the walls themselves, might have served, if not to disrupt the masonry by slow degrees, at least to hasten the destruction of the tower when the walls had once begun to yield; and Professor Boni seems to be of the same opinion. A vault, however, constructed of brick laid in cement, abutting against a wall also of brickwork in cement, would be a very different affair from a construction built with the wretched mortar of the early mediæval period, and it seems as if the ancient vault might safely have been reproduced, in better materials, without resorting to the use of iron girders, which, however durable in a building well warmed and ventilated, and kept in repair, will be severely tried in the darkness and dampness of the Campanile stairway.

AS we have already observed, on occasion, it seems as if something might be done to improve our city architecture, which is far inferior to the rural design in which American architects are so distinguished, by the establishment of prizes, like those which are so eagerly sought after by architects in Paris and Brussels, for buildings actually executed. For a beginning, it would, perhaps, be judicious to confine competitions of the sort to structures of a particular class, and it would undoubtedly be desirable to make at least one award annually, so as to encourage competitors by multiplying their chances of success. We suppose architects in this country would agree that the sort of building which is most unsatisfactorily treated in this country, or, in fact, in any country, and which it is most desirable to improve, is the one-family city house, standing in a block with others. To a building of this kind it is very difficult to give the individual character which is the life of domestic architecture, and there are very few such houses which have any artistic charm beyond what they gain from elaborate detail; but some are to be found in all our large, closely-built cities, and the pleasure which they give is all the greater from the rarity of the examples. It is not necessary that a successful work of this sort should be costly; on the contrary, some of the best houses, at least in New York and Boston, are comparatively inexpensive structures, although, naturally, an artist can do more with abundant resources than with limited ones. The prizes themselves need be trifling. A gold, or even a silver, medal, or, possibly, both, would not involve a large annual outlay on the part of a local society of architects, and the award, perhaps by majority vote of all the members present at an annual tour of inspection of the buildings offered in competition, would attract great professional and public interest. Naturally, the only subjects considered should be those completed since the last previous award, and, as is done in Europe, the architects who have done something which they think deserving of attention should enter their buildings in competition, as horses are entered for a race. In Paris, every competing design in the annual "concours de façades" is photographed or sketched and published, much to the instruction of the public; and the award of a medal would give quite as much pleasure to the owner as to the architect. We imagine that a good many practising architects have felt that, while the travelling-scholarships, and other prizes, so generously distributed in this country among students, are of great value in their way, they have had a tendency to exalt the work of students rather beyond its deserts. That a young man should produce a design superior to that of any of his competitors in a contest for a travelling-scholarship shows capacity, but it does not indicate, as his female relatives are apt to suppose, that he has soared at once to the highest pinnacle of professional greatness. On the contrary, travelling-scholarship designs rarely, if ever, show anything beyond clever copying and a feeling for proportion, which form an excellent foundation for professional eminence, but do not constitute it. Unfortunately, the encouragement given to professional effort stops there; and the travelling-scholar, when he has developed into an accomplished and original artist, finds no one to applaud his work. It is true that he can, by degrees, build up a reputation, but the building of a professional reputation is a slow process, and depends very much, although less than is often supposed, upon accidents of family connection, temperament and other circumstances; and a trifling recognition, from time to time, by competent authority, of professional skill would have a very great effect in encouraging the younger practising architects, and in increasing

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

their reputation and connection in the community. One of the topics most discussed in professional circles is the injury done to the profession and the public by the ignorant pretenders who, under the name of architects, practise every kind of misdemeanor in construction and design, if not in other matters; and it might be well to suggest that the most effective method for relegating these persons to their proper place in the eyes of the public would be for the profession to lead, not in lynching the incapable architects, but in conferring recognition and distinction on the good ones.

WE suppose that we shall be held up to public execration for saying that, devoted as we are to landscape beauty, public hygiene and forest extension, we should not grieve very much if the present scarcity of fuel in the crowded Eastern cities led to the sacrifice of a considerable portion of the shade-trees which line some of the streets of those cities. In the beautiful Western towns, or even in those no farther west than Buffalo or Cleveland, the houses, standing mostly detached, and at some distance from wide streets, or "parks," or "terraces," cannot be injured by trees on the sidewalks, and the latter are, in hot weather, gratefully shaded and sheltered by such trees; but in New York, or Boston, or the older part of Philadelphia and Baltimore, trees on the edge of the sidewalk mean gloomy shadow, instead of sunshine, in the abutting houses, dampness and mould wherever the drip from the foliage can reach, and a confined and unwholesome air in the space bounded by the trunks of the trees, their branches, the fronts of the adjacent houses and the sidewalk. The first, and one of the greatest, of American landscape-gardeners, Downing, who was as devoted and intelligent a lover of trees as any one could be, laid down the rule that no tree should be planted at a less distance from a country-house than twice its own height when fully grown, so that it might never cast an unwholesome shadow on the house; and if the shadow, even of the top of a tree, should be avoided for a country-house, open to the light and sun all around, what shall be said of the practice of planting trees of such dense foliage as poplars and maples within a few feet of the front of city houses, which are entirely dependent for sun and air upon their front and rear windows? Any person with average senses, walking through a street in New York, or Boston, or Philadelphia, or Baltimore, which is partially furnished with shade-trees, can detect at once, as he passes under the trees, an odor from the neighboring gutter, which is not perceived in the portions of the street destitute of trees, where the air circulates freely, and sunshine has a chance to do its work. If the trees stand in front of a provision store, or grocery, their effect in checking diffusion, and causing stagnation of the foul air, is still more conspicuous; and, as the people who live in the houses abutting on the street have nothing better than the street air to breathe, the trees not only deprive them of sunshine, but make the air around them much fouler than it would otherwise be. We should be far from wishing to deprive those who are obliged to pass their lives in cities of any manifestation of the beauty of nature that it is possible to give them, but sunshine, in a city house, is worth more than trees, where it is not practicable to have both; and landscape-gardeners are quite capable, if called upon, of contriving sidewalks with borders of flowering or evergreen shrubs, instead of trees. Such borders, which are already occasionally seen here, do not interfere either with light or air, and their effect is quite as rural as that of a straggling row of trees, and is much more finished and cheerful.

IT appears that an interesting work has been going on in Chicago for several years, without the knowledge of the public, in the excavation of a tunnel, fourteen miles long, under the business district of the city. This tunnel is a business undertaking simply, and is to contain a railway for the transportation of freight among the great mercantile houses, and between them and the freight-stations of the forty-two railways which enter Chicago, besides furnishing accommodation for telephone-wires, and, possibly, wires of other kinds. It is almost incredible that a tunnel of this length, varying in width from six to thirteen feet, and in height from eight to fourteen feet, could have been constructed under the most crowded part of a great city without the knowledge even of the newspaper reporters; but the tunnel is far below the surface, the depth varying from twenty-seven to sixty-five feet, so that it was unnecessary to make temporary roadways over it, and the excavated material has been taken out at night, through shafts opening in private ground, and taken away to the lake-front. The ground under Chicago is a soft clay, which was easily excavated, but it has been necessary to line it everywhere with concrete. A considerable portion of the tunnel is already in use, and many business houses have shafts opening into it, equipped with elevators, by means of which freight packages, brought by cars running on the tracks laid in the tunnel, are hoisted to the warerooms. Although an underground freight-railway of this kind seems an expensive substitute for trucks and horses, it is quite possible that it may promote economy, as well as convenience, in handling and transferring merchandise. Every one must see that the maintenance of a stable-full of horses and wagons, and of a multitude of grooms and drivers, is an important item in the cost of carrying on business, especially when, as is often the case, the wagons are driven half the time empty, or with only one small package in them; and a system by which goods arriving by rail could be at once delivered at their destination, with the minimum of handling, while those shipped could be billed through from the shipping-clerk's desk, would be of immense advantage to merchants, as well as to the public.

M. PLANAT has thought of an ingenious plan for relieving the parks, gardens and other public places of Paris from the deluge of statues and monuments with which they are already nearly choked. As he says, the street-crossings being already occupied, the gardens so filled that there is little room left for grass and flowers, and even the intercolumniations of public buildings appropriated, it is necessary to make some provision for the future monuments of the great men who may be expected to make their appearance in the world at a certain average annual rate, and whom their friends will certainly wish to commemorate. As the production of sites for statues in new gardens and parks is already very inadequate to the demand, he infers that a provision which increases with the expansion of the city, and therefore, presumably, with the production of great men, is absolutely necessary, and he finds opportunity for such a provision in the walls of the tunnels for the Metropolitan Railway, which, he suggests, might be converted into a sort of twentieth-century Campo Santo, and lined with "up-to-date" memorials of the "men of progress" who are to make that century illustrious. The passengers in the express-trains would not, perhaps, have, at first, all the time that they might wish to study the works of art that they passed on their route, but we cannot doubt that the advance of civilization will quicken the perceptions of the multitude, and a judicious disposition of the electric-lights for bringing out the salient beauties of each object would aid in producing rapid and correct impressions. M. Planat thinks that the useful might be combined with the agreeable by giving a statue of a great musician, let us say, an electric-bell to hold; while a Conservative Deputy might be immortalized in an artistic signal for stopping trains, and a machine for setting switches might take the form of an influential diplomat. In this way, as he says, the question of the proper attitude and gesture to give the subject, often a very embarrassing one for the sculptor, would be immediately solved.

THE twenty-first anniversary of the opening of the School of Architecture of Columbia University was celebrated a few days ago by a dinner at the rooms of the Society of Fine-Arts given to Professor W. R. Ware by his former and present pupils. About one hundred and fifty gentlemen were present, including many of the most distinguished members of the profession.

MR. WILLIAM ROCKEFELLER has presented to the New York Zoölogical Park a fountain which has an interesting history. It seems that a Roman antiquarian, when making a visit, some years ago, at Lake Como, discovered a fountain, sculptured in granite, which formed one of the ornaments of an old villa on the shore of the lake. It was supposed that the fountain dated from the latter part of the seventeenth century, but there were no records or other evidences of this, or of the name of the sculptor. The antiquarian bought the fountain, and removed it to Rome, where it was seen a year ago by Mr. William Baumgarten, a well-known connoisseur and dealer in New York. Mr. Baumgarten brought home a photograph of the fountain, and showed it to Mr. Rockefeller, who offered to buy it, if it could be placed in the Zoölogical Park. This was arranged with little difficulty, and the fountain is now in New York, ready to be placed in position.

NOTES ON IRON AND STEEL CONSTRUCTION.[1] — XII.

IN the above discussion and table of values the corrugated bars are supposed to have ½ inch of concrete under them, while the expanded-metal, which is laid directly upon the centring before the concrete, is placed ¼ inch from the middle of the metal to the under side of the concrete.

The reënforced concrete spread-footing is particularly adapted to the construction of a foundation supporting two columns. This is due to the fact that the footing may be made any desirable shape and can be so proportioned that the unit-pressure upon the soil will be practically uniform and the centre-of-gravity of the loads will coincide, or nearly coincide, with the centre-of-pressure from the soil beneath. The principal features in the design of such footings consist in having their plan of the correct dimensions and in providing the necessary reënforcement of metallic rods or bars.

In Figure 87 is shown a diagrammatical plan of a reënforced concrete footing supporting two columns, one at each end. In this case the loads on the columns vary greatly, for one is an exterior column supporting heavy wall loads and the other is merely an interior column carrying floor loads more or less light in comparison. It is evident, therefore, that in order that the pressure upon the soil may approach uniformity that the plan of the footing will necessarily be other than a rectangle and that it will evidently be trapezoidal, as shown in the figure. The condition to be attained is that a line passing through the centre-of-gravity of the area represented by the trapezoid shall coincide with centre-of-action of the pressure of the soil from beneath the footing.

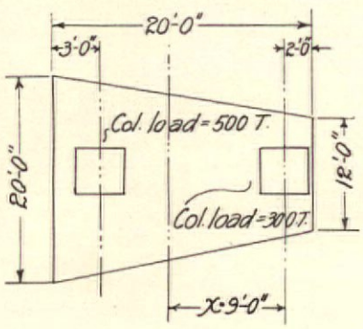


Fig. 87.

It is, therefore, first necessary to determine where this centre-of-pressure is located with respect to the two column loads. By the principal of moments it is evident, with reference to Figure 87, that the centre-of-pressure is located between the two loads so that the distance from the centre-of-pressure to either load is inversely proportional as the ratio of the respective loads on the columns. For instance, the centre-of-pressure is located at a distance from the load a expressed by the following proportion: —

$$500 : 300 :: 15 : x$$
$$500\,x = 4{,}500$$
$$x = 9 \text{ feet}$$

Hence, the trapezoidal foundation must in the plan fulfil two conditions, namely: it must have sufficient bearing-area so that the safe allowable unit-pressure on the soil is not exceeded and it must be so proportioned that its centre-of-gravity of area approaches a point 9 feet from the greatest column load.

Assume, therefore, that the allowable unit-pressure is 2.5 tons and that in consequence an area of the requisite extent must contain 800 ÷ 2.5, or 320 square feet.

The area of a trapezoid is equal to the distance between the parallel sides multiplied by one-half the sum of the length of these sides, or, as it may be expressed algebraically: —

$$A = l\frac{a+b}{2}$$

In which A equals the area, l the length, or distance, between the parallel sides, and a and b^2 equal respectively the lengths of these sides. Since the length of the footing is known from the figure to equal 20 feet, the length of one side may be assumed and the length of the other thus determined, for having the length of one side the length of the other may be expressed by

$$a = \frac{2A}{l} - b$$

so that by assuming the value of b to equal 20 feet, by substitution the value of a is found to equal

$$\frac{2 \times 320}{20} - 20, \text{ or } 12 \text{ feet},$$

and the plan of the footing becomes as designated in Figure 88.

[1] Continued from No. 1402, page 46.

It is now requisite that the area included between $c\,e\,d$ and f be analyzed to ascertain the position of the centre-of-gravity of the plan or the centre-of-pressure of the soil from beneath.

In order to find this position of central pressure, connect e and c, as shown, and determine the position of the centres-of-gravity of the two triangles, $e\,d\,c$ and $c\,e\,f$, by drawing from two

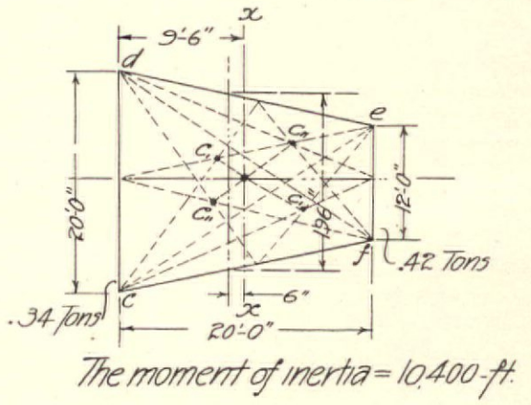


Fig. 88.

angles a line to the centre of the opposite side, and where these several lines intersect will be the required centres. Connect these centres as shown, and again divide the figure by a diagonal from d to f, dividing it into two other triangles included between the points $d\,e\,f$ and $d\,c\,f$. Find the centres-of-gravity of these triangles as before and connect them as shown. The intersection of $c_1\,c_1$ and $c_{11}\,c_{11}$ will give the required centre-of-gravity of the trapezoidal plan. In this case the centre-of-pressure from the soil is 9½ feet from the wide end of the footing and 6 inches from the centre-of-gravity of the loads.

Having this data, we may now determine the amount of steel necessary to introduce in the form of reënforcing bars to be placed on the tension side of the concrete footing, and in order to obtain the number of square inches of metal required the maximum bending-moment must be obtained.

The total load upon the footing, and consequently the resultant from the upward pressure of the soil, is equal to the sum of the column loads, or 800 tons, while the mean pressure on the soil is 2½ tons per square foot of footing area; the latter amounting to 320 square feet. The plan of the footing is shown in Figure 88 and its moment-of-inertia, or I, is by calculation equal approximately to 10,400. The distance from the line of resultant pressure of the soil measured by the area of the footing

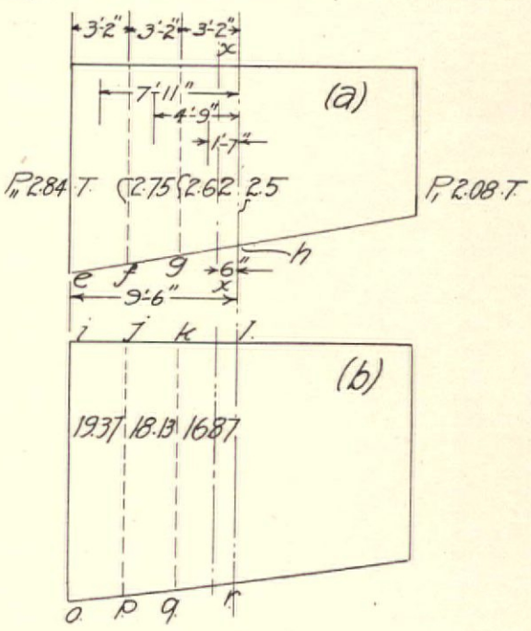


Fig. 89.

and the line representing the centre-of-pressure of the two column loads is according to the diagram 6 inches, or .5 foot. The moment produced by the resultant of the two column loads is equal to M, or $\frac{s\,I}{y}$, in which s equals the pressure on the

soil at the extreme edge of the footing, I the moment-of-inertia of the footing-area just assumed and y the distance between the lines of upward and downward pressures.

The value of M in the problem is equal to $800 \times .5 = 400$ foot-tons. The pressure variation at the edge $e\,f$ equals s, or $\frac{-400 \times 11}{10{,}400} = -.42$ tons, while the pressure variation at the edge $c\,d$ equals s, or $\frac{400 \times 9}{10{,}400} = .34$ tons. The variation in pressure may then be shown in the diagram (a) in Figure 89 when the pressure p_1 is found to equal $2.5 - .42$, or 2.08 tons, and the pressure p_{11} is likewise found to equal $2.5 + .34$, or 2.84 tons.

The maximum bending-moment on the footing is along the line $x\,x$, or the line of the resultant pressure from the soil, and it is equal to the algebraic sum of the moment of one of the column loads and the moment of the pressure from the soil beneath. The moment of the column load is equal to its amount multiplied by the distance from the axis of the column to the line $x\,x$, while the moment of the pressure from the soil opposed to the moment of the column load is equal to the amount of the pressure upon the portions $i\,j\,o\,p$, $j\,h\,p\,q$ and $h\,l\,q\,r$ of the Figure 89 at (b). The moments of these portions are equal to the product of their area and the average pressure upon them by the distance from their centres-of-gravity to the line $x\,x$. These several values may be obtained from the two diagrams (a) and (b), Figure 89, and the necessary calculations made as follows: —

Area of portions.	Average pressure.	Lever arms.	Moments.
$19.37 \times 3.16 \times$	$\frac{2.84 + 2.75}{2}$	$\times 7.91$	$\times 1{,}344.48$
$18.13 \times 3.16 \times$	$\frac{2.75 + 2.62}{2}$	$\times 4.75$	$\times 729.30$
$16.87 \times 3.16 \times$	$\frac{2.62 + 2.5}{2}$	$\times 1.58$	$\times 215.39$

The sum of the moments due to the pressure of the soil equals 2,289.17 foot-tons.

This moment in foot-tons may be reduced to 4,578,340 foot-pounds, or 54,940,080 inch-pounds.

The positive moment due the weight of the column load is equal to $500 \times 6 = 3{,}000$ foot-tons, 6,000,000 foot-pounds, or 72,000,000 inch-pounds. The difference, or algebraic sum, of these two amounts equals $72{,}000{,}000 - 54{,}940{,}080$, or 17,059,920 inch-pounds, which, if a factor of safety of 4 is desired, will be increased to $17{,}059{,}920 \times 4$, or 68,239,680 inch-pounds.

The resisting-moment of the reënforced concrete must then equal this latter amount. From Formula (10), previously given, is noted that the resisting-moment, or

$$Mo = \left[\frac{5\,b\,F\,E_c}{12\,E_s} + \frac{5\,b\,f_c}{12}\right] y_1^2$$

or, taking out the value of b,

$$Mo = \left[\frac{5\,F\,E_c}{12\,E_s} + \frac{5\,f_c}{12}\right] b\,y_1^2$$

In this case the elastic limit of the steel rods reënforcing the concrete was taken at 30,000 pounds, and the values in the formula are as follows: —

$F = 30{,}000$ pounds.
$E_c = 4{,}800{,}000$ pounds.
$E_s = 30{,}000{,}000$ pounds.
$f_c = 1{,}500$ pounds.

The value of the expression in the brackets then becomes equal to $\frac{5 \times 30{,}000 \times 4{,}800{,}000}{12 \times 30{,}000{,}000} + \frac{5 \times 1{,}500}{12}$, or 2,625, so that $Mo = 2{,}625\,b\,y_1^2$. The value of b, which is the width of the concrete-footing along the line of rupture, or the line $x\,x$ in Figure 88, is approximately equal to 196 inches. By transposition, the value of

$$y_1^2 = \frac{Mo}{2{,}625\,b}$$

and

$$y_1 = \sqrt{\frac{Mo}{2{,}625\,b}}$$

or, since Mo equals the bending-moment, which is 68,239,680, so that

$$y_1 = \sqrt{\frac{68{,}239{,}680}{2{,}625 \times 196}} \text{ or } 11.5 \text{ inches.}$$

This value is the distance from the neutral axis of the section through the footing to the centre-of-gravity of the reënforcing bars. The value of y_2 for rock-concrete according to formula (8), as previously quoted, is obtained from the expression

$$y_2 = \frac{2\,F\,E_c}{3\,f_c\,E_s}\,y_1$$

and by substitution,

$$y_2 = \frac{2 \times 30{,}000 \times 4.800{,}000}{3 \times 1{,}500 \times 30{,}000{,}000}\,11.5, \text{ or } 24.5 \text{ inches,}$$

and the entire thickness of the concrete-footing is made up of the following: —

$y_1 = 11.5$ inches.
$y_2 = 24.5$ inches.
Total..... 36 inches.

This is, however, merely the theoretical thickness and there must be added at least 3 inches at the top and bottom to allow

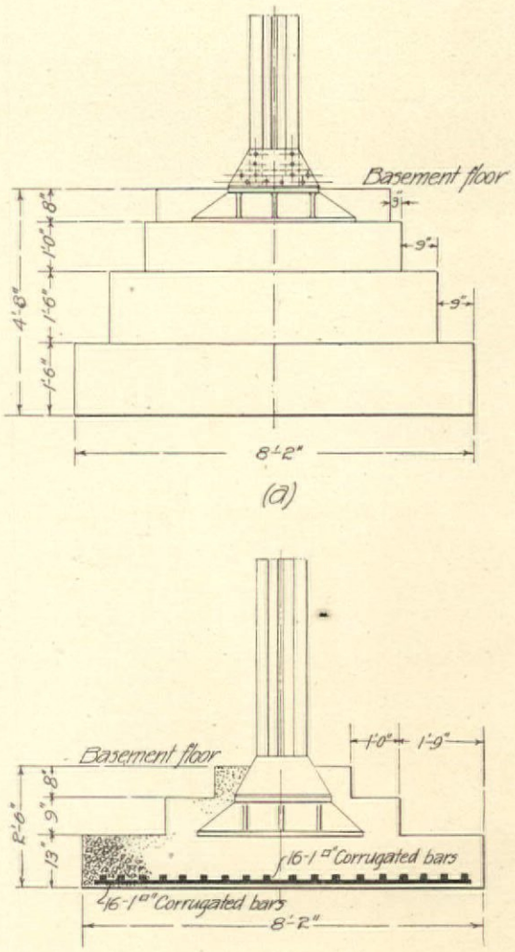


Fig. 90.

proper bedding for the reënforcing bars, and hence the entire thickness of the footing will equal 42 inches.

The last of the problem consists in determining the number of reënforcing bars required. Assuming that the square corrugated bar previously described and illustrated is used, and that a bar 1 inch square is employed with an area of about .64 square inches, the number of square inches of metal required at the section of maximum moment may be determined from the formula given in the first part of the quoted discussion. This formula is $\frac{a^2\,b}{d}$, in which a^2 equals the area of the bars in square inches, b width of the section considered in inches and d the spacing of the bars in inches. In this problem the area of the bars is taken at .8 square inches, while b obtained from Figure 88 is found equal to 196 inches and the spacing of the bars will be taken at 1.8 inches, for that distance corresponds

to the result obtained by applying formula (8) in the discussion, this formula being dependent upon the value of d as given.

Then by substitution, the total sectional-area required, or $A = \frac{.64 \times 196}{1.8}$, or 70 square inches, which would require as an equivalent the area of 109 bars.

The comparison of cost between two footings made to support an equal load upon soil of the same bearing-capacity is very clearly illustrated in Figure 90 at (*a*) and (*b*). These footings, which were designed by the Expanded-metal Fireproofing Company, of St. Louis, show upon a comparative estimate a saving of at least 20 per cent in favor of the footing with the corrugated bar system introduced instead of the all-concrete footing. The estimated cost of the construction shown at (*a*) itemized as follows: —

Excavation	11.53 cubic yards	at $.75 =	$ 8.65
Concrete	202.03 cubic feet	at .26 =	52.60
		Total.....	$61.25

While the estimate for the construction described in (*b*) is as stipulated below: —

Excavation	6.18 cubic yards	at $.75 =	$ 4.64
Concrete	.86 cubic feet	at .26 =	22.36
Extra length of column	83 pounds	at .03½ =	2.92
Corrugated bars	720 pounds	at .03 =	21.60
		Total.....	$51.52

Where a comparison of the cost has been made between steel-beam grillage footings and corrugated-bar or reënforced concrete foundations, there is found to be a saving of from 30 to 50 per cent in favor of the footing constructed of reënforced concrete. In the comparison the footings were proportioned as nearly as possible of like strength. M. M. Sloan.

[To be continued.]

THE DUTY OF THE ENGINEER. — II.

TO HIS CLIENTS OR EMPLOYERS.[1]

THE section which I discuss presents two general classes — "clients and employers" — as those from whom the engineer is expected to earn his living, and the following definitions are offered as distinguishing the classes: —

An engineer's "client" is an individual, firm, or corporation calling upon him for special or temporary service, the performance of which terminates the relations. This connection may cover a single engagement, or it may represent a series of periodic or spasmodic engagements. But in each particular case it may be assumed as a general rule that the more faithfully and energetically the engineer represents a client, the earlier his temporary engagement terminates.

An "employer" may be considered as an individual, firm, or corporation, served by an engineer under a regular compensation for a specified period, actual or implied, assurance justifying the expectation that loyal service will bring advancement, or at least continued employment. To state the distinction briefly in shop vernacular, an engineer when serving clients faithfully is "working himself out of his job," but when loyally representing employers he is "holding down his job."

The ethics which govern a true engineer are the same in each case, and he will be as faithful to the interests of clients during a temporary engagement as to those of employers under a longer term.

Accepting the definitions of client and employer, the relations of the engineer may be expected to be closer and more confidential with employers than with clients. The almost constant contact of the engineer and employer permits of mutual confidences, the abuse of which by either party is little short of criminal — confidence which permits the principal to trust the engineer and the latter to advantageously serve his employer.

Under normal conditions a client and the engineer meet often as strangers, the engineer being selected because of his reputation and the client served because of his reported financial standing. Each must, however, meet the other in confidence, and clients often place important interests at the dictum of an engineer almost unknown personally, this action being dictated by the reputation of the engineer. The profession may well be proud of such recognition, and as the reputation of the engineer is his capital, he is a fool who impairs it by acts which jeopardize his good name among men, and bring to him the unrest which follows deviation from the path of rectitude. Being treated with confidence, it is his duty to deserve such recognition by faithfully guarding the interests of either client or employer.

In his intercourse with clients and employers the engineer coöperates with all phases of the "genus homo." He may find the individual or company employing the engineer because of special knowledge, generously recognizing this knowledge, and giving him unreserved confidence, unless the engineer demonstrates incapacity or violates this faith, when a directly opposite course is justly pursued. But the work is not always so pleasant nor the duty so plain. The engineer meets with those who, failing to discriminate between power applied and power exhibited, run great risk by demonstrating brief authority, often with a result such as befell the owner of a fractious horse, who grasped the reins from the hands of a competent driver at a critical time. The driver, of course, was blamed for the loss of the horse and vehicle and for the crippling of the owner, while the owner was at fault.

There are occasions when the engineer must assert his position in opposition to a client or employer, but such assertion should be based upon his interpretation of loyalty to the interests entrusted to him, and not by wounded pride. Circumstances may arise which demand that to protect the interest of his client he must refuse to follow a procedure suggested, or to follow it under formal protest, although such action may jeopardize his position or engagement. . . .

In specifying materials or appliances, the engineer's duty to his clients or employers requires that he secure those best suited to the purpose, at least cost to his principals, and his specifications must, therefore, be drawn to invite as active competition as practicable. It is the safer policy to have an excess of bids than by restrictions to place the client or employer in the real or fancied power of bidders.

Each engineer has his preferences and is entitled to express them, but in determining "duty" he is wise who encourages active competition for work submitted to him.

The engineer who chooses his profession as a means of acquiring wealth seldom reaches that goal. If he is able to live in comfort and with but moderate anxiety for the future, he is in advance of the majority of his professional brethren. With him "a good name is rather to be chosen than great riches." There are comparatively few engineers who may be considered rich, and this limited number includes men whose accumulation has been the result of judicious investment, of legacies, or of business outside of or possibly related to engineering.

With such conditions facing the engineer, and appreciated by those with whom he associates in business, the temptation is great to augment an income by means which are inviting, and some of which at least do not suggest impropriety. Probably commissions present the most subtle of these temptations, for the engineer recognizes that members of some kindred professions depend largely upon these for revenue. This is a subject which could be discussed at length, but in determining his duty to clients he may have as a guide the statement that "no man can serve two masters."

The compensations paid to engineers do not, as a general rule, equal those received by other professions in which the cost of preparatory study and work, or of library, and the expenditure of time and energy, is less. But having entered the service of client or employer, the acceptance of commissions without their knowledge and assent places the engineer in an unsafe position; and although his earnings may be unsatisfactory, he must be true to those whose service he has entered, be this temporary or permanent.

Engineering is an exact science and it is expected to produce definite results. The client or employer submits problems which he expects the engineer to work out with the greatest practicable precision. But he is employed as a human being, and as such he is fallible. When engineers cease to err it will be after, having done their duty to God and man, they pass beyond the sphere where clients and employers exist.

In determining his duty the engineer is called upon to use the exact science upon which the foundation of his profession is laid, so as to present to client or employer the nearest approach to correct results which his education and experience, supplemented by conscientious study of the work of others, permit.

With a profession that has accomplished so much, with an appreciation of its honor, with as pronounced integrity as exists in any other profession or business, we cannot afford to have a standard or hold a position which is not the highest.

TO HIS CONTRACTORS AND EMPLOYÉS.[2]

For about thirty years of my life I was engaged as an engineer, in a practice sufficiently varied to bring me into contact with nearly all kinds of contractors. During the last ten years of my life I have been more or less a contractor, and this, I think, permits me to speak at least in the light of experience on both sides of the question.

The proper presentation of the third subdivision of this topical discussion, or "The Duty of the Engineer to his Contractors and Employés," will be difficult to accomplish in the short time at my disposal. I therefore trust that this branch of the subject will be amplified in the general discussion which will follow.

The engineer in responsible charge is generally either the author of the plans and specifications upon which the work is to be carried into effect, or he is the employed agent of such author. In either case his relations to the contractor are the same. He is assumed to be an expert in the work which he designs or directs, and the assumption warrants the inference that his knowledge of the work in all its details is as great, if not greater, as that of the contractor. This assumption is justified by the usual declarations of the specifications, making the engineer the only recognized interpreter of the meaning of the plans and specifications for the work covered by the same.

[1] Extracts from a paper by Mr. John Birkinbine, read at the Engineers' Club, of Philadelphia, and published in the *Proceedings* of the same. Continued from No. 1402, page 47.

[2] A paper by L. Y. Schermerhorn, read at the Engineers' Club, of Philadelphia, and published in the *Proceedings* of the same.

No two engineering works are more than generally alike; and specific differences will exist that make each work a special study and almost a special design. Through the preliminary study given to the development of the plans and specifications the qualified engineer should be able to acquire a fuller knowledge of the details of the work than can generally be obtained by the contractor through means and time usually at the latter's disposal, between the issue of the plans and specifications and the tender of the contractor's proposal for the work. This establishes the fact that, except in simple and routine constructive work, the designing-engineer has a better opportunity than the contractor to thoroughly familiarize himself with all the difficulties and uncertainties of the work. Therefore in this respect the designing-engineer enjoys an advantage over the contractor which it is his duty to recognize, through the plans and specifications, by fairly placing before the contractor full information upon points which otherwise would escape the contractor's knowledge. His duty is something more than to vaguely suggest possible difficulties and requirements, and then create for himself a refuge, by ignoring all responsibility for lack of reliable data, by providing that the information upon essential points in the specifications is not guaranteed, and that the contractor through his personal knowledge and examination will be assumed as having full and correct information upon all matters involved in the work, even though the engineer may have suppressed a part of his information. It goes without saying that the contractor has, in the end, to assume such responsibilities; but it should be based as far as possible upon a full knowledge and frank avowal of all that the engineer knows of the work.

This duty of the engineer is a delicate one, and the personal equation of the individual will largely determine his action in the matter. Should his personal views be interfered with by those of his employer, then the engineer must determine for himself how far the ethics of his profession and his duties to himself and his fellow-man will rightly permit his judgment to be overruled by his superiors. To intentionally suppress important information which would be difficult or impossible for the contractor to obtain is at once a crime against the public and an error which is more than likely to assert itself unfavorably in the work with which it is connected. Dishonesty in the administration of work will surely result in dishonest execution, and this in turn may lead to disaster, involving both property and human life.

There never was an alleged wise saw that had less foundation in fact than that which states that "competition is the life of trade." If the word *death* were substituted for *life*, the statement would be nearer the truth. In nearly all callings, intelligence, ability, and its proper accompaniment, reputation, count for much in winning business success. In the other professions we never hear of assignments made on the basis of competition; and yet the engineer is too often forced to carry his plans into effect under a system of unqualified competition that is at once destructive of good results and unfair to the contractor who will only do his work in a proper manner, and whose prices are based upon such a method of work as will ensure satifactory results to the engineer and to those for whom the work is done.

Open, unqualified competition, without reservation as to awards thereunder, is an invitation and an encouragement to the incapable, unwise and dishonest contractor to enter into competition with the contractor who believes that capacity, experience and honesty are essential elements both to his success and to the success of the work that is to be carried into execution. When incapacity, inexperience and dishonesty are joined with political pull and favoritism, the premium placed upon the dishonest execution of work is such as to forbid competition on the part of contractors who do not adopt such methods.

The duty of the engineer under such adverse conditions is plain, for he must either be in a position to demand and secure the proper execution of the work entrusted to his charge, or he must retire himself from a responsibility which is almost sure to result in the dishonest execution of his plans and designs. The engineer owes at once a duty to his employers and the public, through which, by all legitimate means, the incapable and dishonest contractor is excluded from the possibility of competing for work to be done under the engineer's direction; and if it is impracticable to accomplish such an end by not allowing this class of contractors to bid upon work, the power and authority should be inherent in the specifications to permit the exercise of a discrimination which can be used to prohibit his securing the work.

The undesirability of unqualified competition is well recognized through the manner in which individuals and many large corporations invite proposals for required work or materials; viz, by placing their proposals only in the hands of such parties as are known to be capable, experienced and honest. In the main, our cities and the general Government are the only parties who do not adopt ordinary business methods in selecting their contractors, and where the only criterion is the lowest prices offered for the work to be done or the material to be furnished.

With the United States Government this method of unrestricted competition is carried to the extreme, upon the theory that the bidder's or contractor's bond establishes the responsibility of the bidder or the contractor; and more attention is given to very exact compliance with instructions as to the seals and notarial attestations upon the bonds than is given to the ascertainment of the fact whether or not the bonds have any real financial value. As a result of this method the Government has constantly upon its public works failing and defaulting bidders and contractors, against whom legal action is seldom taken toward the enforcement of the penalties provided in the contract. While there may be a theoretic value in the moral effect of bonds and penalties named, such effect is lost upon the irresponsible and dishonest contractor, who through a long experience has gained a valuable knowledge of shrewd methods and tricks by which he can escape their enforcement, and upon which he fully counts when he enters into contract.

The engineer who is brought into administrative contact with the irresponsible and dishonest contractor will find himself quickly engaged in a conflict, whereby the efforts of the engineer to enforce the proper performance of the work will be met by every effort on the part of such a contractor to cheapen the work, or else to prepare the way for a successful escape from the penalties of his bond, if the work is not carried to satisfactory completion. The engineer who has gone through such experiences emerges from the conflict always a disappointed, but generally a wiser, man.

From an experience of many years the speaker has been brought to feel that many engineers are inclined to hold a responsible and conscientious contractor to a more rigid enforcement, even of non-essentials, than an incapable and dishonest contractor to matters essential to the proper performance of the work. The reason for this is that it is easier to secure exact compliance from the former than even approximate compliance from the latter; but the question arises whether the engineer has a moral or professional right to attempt to move in such matters along the line of least resistance.

Considering the engineer as the direct agent of the parties who are to pay for the work done, it may not seem unnatural for the engineer to yield to the temptation of seeking the accomplishment of his work at the least possible cost to his employer, regardless of what he knows to be the real intrinsic value of the work. Adopting this view, some engineers encourage unqualified competition to its extreme, and attempt to reduce each letting of work to the methods and principles which surround the bargain-counter.

Every work is worth its absolute cost as carried into proper execution under wise, economic and efficient administration, plus a reasonable profit to the contractor. The engineer who seeks to accomplish his work at less than what he knows to be its true value violates the fundamental principles of sound business, and thereby lends himself to the perpetration of a fraud upon the public, and an injustice to his employer and his contractor.

The engineer in responsible charge of work cannot give his unqualified time and attention to the details as they are carried out in the field; he therefore must delegate this duty of immediate supervision to his assistants or inspectors. Frequently this duty falls into more or less inexperienced hands, with the responsible engineer often far removed from the work, or else not easily accessible. The value is very great to the contractor and to the work of having at all times immediately accessible a representative of the engineer who, through training and experience, is qualified in an emergency to promptly act for his superior. Wisely as plans and specifications may be prepared, they are nevertheless not inspired and inerrant, and often the unexpected and unprovided-for contingency will arise that demands correct judgment and instant action, based on experience, and a large amount of level-headedness and common-sense. If at such times the representative of the engineer does not possess these qualities, both the work and the contractor will be sufferers; and these are injuries the engineer has no moral or professional right to inflict on either the work or the contractor.

Carefully as plans and specifications may be prepared for works involving much detail, they can seldom provide for every variation from the normal which may occur; and when such variations do occur, the representative of the engineer who reads his specifications as though they were his Bible, expecting to find therein provision for all things, will surely be disappointed, and the work and the contractor will as surely suffer through the inspector's ignorance and misguided faith. No more unsatisfactory representative of the engineer can be found than he who is unable to call to his aid experience and common-sense in interpreting the true spirit and intention of the plans and specifications.

It follows from these conditions that among the duties which an engineer owes to his contractor is that of being represented upon the work by an assistant who has other qualifications than those of being related to somebody, or one who votes on the right side, and who may therefore enjoy the favor of the district politician. An assistant or an inspector whose employment is based upon qualifications other than his fitness for the work, and whose tenure of office is not measured only by his capacity and known honesty, is an injustice to the contractor, and a standing menace to the work upon which he is employed.

The position which the engineer holds as to his employer and his contractor is without its parallel in the other professions, and his duties which arise thereunder to these parties are at once responsible and delicate. The engineer is quite generally made the only authoritative interpreter of the true intent and meaning of the plans and specifications; and the specifications more or less definitely provide that he shall determine every question, difference or doubt in relation to and arising from the work undertaken, and shall decide every question which may arise relative to the execution of the contract on the part of the contractor; that his estimates should be held as final; and that his specific conclusions and decisions shall be beyond appeal.

These broad and conclusive powers would suggest that the engineer

is an arbitrator between his principal and the contractor, and clothed with the fullest power of decision and action; and yet the analogy is not complete. An arbitrator should be a disinterested party, and such the engineer is not. An arbitrator should not be under the pay or influence of either party; the engineer is manifestly under both from his principal. An arbitrator should have no interest in the questions he is to decide; the engineer is called upon to support his interpretations of his own plans and words, and to justify his estimates and conclusions generally. The position and its duties are anomalous, and a legal authority, commenting on the situation, said: "Under these conditions the contractor's rights depend upon his good luck in having his work under the supervision of an honest and conscientious engineer; and that the employer's obligations to pay or to perform depend upon his approval and the behavior of his engineer"; and that under such conditions "the courts undertake to guarantee the contractor that the employer or his engineer shall not capriciously nor unreasonably exercise his power to defeat the contract, or deny the contractor his just and reasonable compensation." No engineer has a right to force a reasonable contractor to carry into the courts the determination of questions that arise between them; for most contractors know that after resort to such an expedient their subsequent lot would not be a happy one; and that their position thereafter would be sadly prejudiced.

The apparent arbitrary power given to the engineer in the usual specifications and engineering contract, and which are probably generally conceded by the contractor, have their limitations in practice. Numerous decisions of the courts stamp with disapproval contract stipulations which tend to bind parties, before the occurrence of an event, to the arbitrary reference of matters arising from such events to an arbitrator without judicial functions. Neither have the courts regarded with favor the attempts of parties to oust their jurisdiction through unqualified agreements for arbitration. It should not be forgotten that all agreements for arbitration are revocable by either party at any time before the decision has been rendered by the arbitrator. This further indicates the attitude of the law toward arbitration. A very recent case decided by Judge Lawrence, of the New York Supreme Court, well illustrates this subject. Under a contract it was provided that, to prevent all disputes and litigations, it was agreed between the parties to the contract that the engineer should determine all questions of difference, and was to fix the amount and quality of the work to be done; and that the findings, estimates and decisions of the engineer were to be final and conclusive. The Court held that this provision in the contract was clearly to make the engineer the absolute and final arbiter as to all questions arising between the parties; that the provision in question, if made operative, would oust the courts of jurisdiction; and therefore it was decided as being void on the ground of being adverse to public policy. This decision is in harmony with well-established judicial maxims and conclusions, and is supported by a long line of decisions.

Through the very powers which are, of necessity, given to the engineer, he owes a duty to his contractor and to his employés to treat all situations and conditions which may arise with judicial fairness; and while entitled to insist upon the full and proper carrying into effect of the work undertaken, he should not forget that his contractor holds rights which honesty and justice demand shall receive fair recognition. To fully meet the requirements of such a situation and its duties bespeaks for the engineer the admirable traits which we believe are an accompaniment of the profession under its best development.

Contrast such a view of the duties of an engineer to his contractor or his employés with the following, as set forth in a text-book intended for the use of the profession: "The engineer is in the interests of the proprietor, and receives his compensation from him. . . . He is not required nor expected to watch the contractor's business, nor to promote his interests, and any attempt to do so might render his position untenable, change the relations of the parties, and render the stipulation of his choice invalid." Again the same writer states: "The engineer owes no duties to the contractor except what he can demand by the terms of his contracts; he is under no obligations to protect his interests or assist him in his affairs." I should be sorry indeed to believe that such a doctrine could be held by the engineer who dignifies his profession and its duties, and who believes that these duties have their foundation in honesty, intelligence and justice.

THE PHILADELPHIA CITY-HALL.

ALONG with the announcement that after thirty-one years of work one of the largest buildings in America is nearing completion comes another to the effect that the big pile is so overcrowded that its 4,500 tenants are beginning to call for the addition of another story, says the New York *Sun*. This despite the fact that the structure, Philadelphia's City-hall, has 682 rooms with a total floor-space of 118 acres and has cost about $25,000,000.

George G. Pierie, Chief of the Bureau of City Property, and John M. Bunker, the building's superintendent, are being bothered with another complaint. They are told continually that the building's twenty-two elevators cannot accommodate the thousands of persons who enter the hall daily.

A recent report, in endeavoring to explain this expenditure, reveals some interesting facts. It states that $317,000 has been paid to the architect and his assistants in salaries since 1871, when the building was begun: $351,490 for paint and painting; $5,500,000 for 1,464,000 cubic yards of marble for marblework; $4,000,000 for fitting-up rooms; $1,343,000 for watchmen and cleaners; $736,000 for electric-installation; and so on.

The installation of electricity furnished an interesting incident in the hall's history. When the walls were erected electric-lighting was unheard of, but when its usefulness was demonstrated the now extinct Public Buildings Commission ordered electric-equipment.

The electricians had to chisel through the stone walls for the wires at an expense of thousands of dollars, and it took them the better part of five years of steady work to wire the building. Now, however, the hall has a plant capable of furnishing all the light a city of 30,000 or 40,000 inhabitants could possibly use.

The dynamo-room is one of fifty-nine in the building's basement, which runs not only under the hall, but the plaza in the centre as well. These basement-rooms teem with surprises. For one thing there is a sand-bed filter with a daily capacity of 1,000,000 gallons of water, and the employés and thousands of strangers who daily tread the corridors manage practically to consume this amount. Thousands of gallons are carried to their homes by the employés, for the water furnished the Philadelphia householder is about the worst on earth and will be until the city gets its big filter-beds in working order.

Like the lowest portion, the highest part of the building, the tower, is an interesting and curious place. It contains the largest stone in the building, a block of granite weighing 30 tons. It is 12 feet wide, 23 feet long, and 8 inches thick.

The tower's walls are 22 feet thick.

The second highest elevator in the world is in the tower. It runs from the seventh floor, 138 feet above ground, to the base of the Penn statue, an upward course of 372 feet 9 inches. The air-cushions alone cost $25,000. One of the 400 telephones in the building is located in the tower, at the base of the statue.

Then there is the great clock, and the little clock that governs it. Compressed air is the motive-power.

The dials of the great clock are 361 feet above the earth, and the diameter of each is 26 feet. The long minute and hour hands are 12 and 15 feet, respectively, and their weights 225 and 175 pounds. The weight of the dial-frames, with glass, is 5½ tons, and the total weight of the clock is 50 tons.

The little, or master, clock, the clock that really runs, is 143 feet below the great clock by which the city and country folks for miles around regulate their watches. Two years were spent in building it, and its mechanism is as delicate as that of the finest watch.

It rests in a metallic case on a platform built into a wall so no vibration can affect it. Quite unlike the big clock, which in four years collected 3 tons of dirt, the case keeps it free from dust.

Once every minute this clock, which is regulated from Washington, opens the valves which admit compressed air to the tubes connected with the gears. The air moves the hands of the clock up in the tower, which, after all, is just a dummy-clock, for it has only four faces and lets the little clock down below do all the actual work.

Another peculiar thing about the tower is that in the course of a day contraction and expansion, due to the sun's rays, make it lean ¾ inch out of plumb. This peculiarity has been determined by means of a tub of molasses placed far up in the tower, the surface of the molasses varying ¾ inch, according to the lean of the tower.

Then, too, the tower is an insatiable and inveterate destroyer of the birds of the air. The ring of sixteen powerful arc-lights that glow at the base of Penn's statue blinds the birds so that they fly against the tower, are killed and fall to the roofs below. One of the hall's employés has a collection of over a thousand birds that were killed in this manner.

The statue of William Penn that caps the tower weighs 53,348 pounds and is 37 feet in height. The hat is 9 feet in diameter, the rim 23 feet in circumference, the buttons on the coat are 6 inches in diameter, and the coat-cuffs are 3 feet long.

Penn himself has a nose 13 inches long; eyes 12 inches in length and 4 wide; a mouth 14 inches from corner to corner; hair 4 feet long; a face of 3 feet 3 inches from hat to chin; a waist 24 feet; fingers 2 feet 6 inches long; nails 3 inches long; legs 10 feet from ankle to knee.

Between tower and basement are many queer things. The largest room measures 58′ x 71′ and has a floor-area of 4,118 square feet. This is the Common Council chamber, and two three-story houses, Philadelphia style, could easily be placed in it.

Thirteen of the rooms occupied by the city-solicitor's department are furnished in steel. The only things inflammable in them are the wooden tops of a few tables and a half-dozen carpets.

Desks are of steel, as well as doors, window-frames and thousands of fireproof boxes for municipal documents. Four hundred and seventy-seven tons of steel were used in fitting up these rooms and it took seventeen months to do the work.

Another room entirely of steel, except the table-tops, is the Law Association Library, where 38,000 volumes are kept. This library, the second largest of the kind in America, has among its many other treasures one of the two existing sets of transcripts of the complete records of the United States Supreme Court.

The seating-capacity of the seventeen court-rooms is about 8,500. In addition to these 8,500 chairs, 5,000 chairs are scattered among the various offices. Every room has a clock, and each room contains on an average three roll-top desks, making about 2,000 of these in use in the building.

Two chandeliers cost $4,800 each. They are gold-plated. They

hang in what are known as the conversation-rooms, in decorating which tens of thousands of dollars have been spent. These rooms are really reception-rooms for the use of the Mayor and Councils.

The biggest stone column is 24½ feet high and 2 feet 8 inches in diameter. It weighs 14 tons and is of one piece. It and nearly all the stone used in the building came from a single quarry in Massachusetts.

There are nearly three miles of main corridors and one-half that distance of branches.

The five guides declare that, on an average, 600 persons, who have no object in view other than that of sight-seeing, are daily shown through the building. This makes a total of 150,000 yearly.

Bridal couples are in evidence by thousands. When the courts are in session the corridors are so blocked that one can scarcely push his way through.

Twenty-two persons have met death while working on the City-hall. All have been killed by falls. One man recently fell from the brim of Penn's hat. Another was killed by a fall of 12 feet.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

COTTAGE OF J. B. FALLON, ESQ., JAMAICA PLAIN, MASS. MESSRS. LORING & PHIPPS, ARCHITECTS, BOSTON, MASS.

DESIGN FOR BEACON BOULEVARD HOTEL, BROOKLINE, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

THE PARK VALLEY INN. MR. C. M. BARTBERGER, ARCHITECT, PITTSBURGH, PA.

[Additional illustrations in the International Edition.]

HOUSE OF E. J. BERWIND, ESQ., NEWPORT, R. I. MR. HORACE TRUMBAUER, ARCHITECT, PHILADELPHIA, PA.

ENTRANCE PAVILION TO THE SAME HOUSE.

A COMPETITIVE DESIGN FOR THE BOSTON ATHENÆUM, BOSTON, MASS. SUBMITTED BY MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

SECTIONS OF THE SAME.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE LATE WALTER COPE.

PHILADELPHIA, PA., Nov. 8, 1902.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,— At a special meeting of the Philadelphia Chapter of the American Institute of Architects, called to take action upon the death of Walter Cope, the enclosed resolutions were adopted.

Trusting that you will find an opportunity of publishing the same, I am,

Very truly yours,
ARTHUR H. BROCKIE, *Secretary.*

Resolved, that in the overwhelming sadness which the sudden death of our friend and associate Walter Cope has cast about us, we still rejoice in the beauty of his life and his labors, which leave behind them so precious a memory and so stimulating an example. Deeply skilled in his art, there were brought to him from far and near problems of ever-increasing difficulty and importance. He bore joyously the burden of these many tasks, and stood before us steadfast in the discharge of duty, untiring in the pursuit of excellence and beauty, firm in upholding a noble standard of conduct. And yet it is not his work as an architect, distinguished as it is by volume and quality, that leaves with his companions the deepest impression of him, but rather his constant sincerity, his limpid truthfulness, his spontaneity and frankness, his joy in art, his splendid scorn of wrong.

Resolved, that in the death of Walter Cope, the architects of America have lost one of the ablest of their number, and that we his immediate associates mourn him, not alone as a fellow-artist, but as a friend tried in many ways and true in all.

NOTES AND CLIPPINGS

TELEPHERAGE MAILS IN ITALY. — Tests are being made upon a telepherage-system of postal-communication in Naples which seems to be simple and satisfactory. The plant consists of a small aërial railway whose track is made of steel wires, supported at the height of 45 feet on poles 300 feet apart. Small motor-cars run suspended to these wires, and are fed with electric current. The motors are so designed as to communicate to the car a speed of 400 kilometres (250 miles) an hour. With a speed of this kind, all the Italian post-offices would be in communication on a very rapid schedule. In Rome a main post-office is to be installed in conjunction with eight or ten sub-stations, each sub-station being in a tower 75 feet high, provided with a mailing-box at the bottom. All letters mailed are automatically stamped with indications of the month, day, hour, and minute at which the letter was mailed. The letter is then conveyed to the top of the tower, where a special employé is in charge of putting all the mail in the small motor-car, which is then sent to the general post-office. Thence the mail is then forwarded to the different cities of Italy in less than two hours. Each steel wire of the line is designed for carrying a weight of two tons. The motor-cars for letters weigh 75 pounds, and the cars for printed-matters are able to carry 2,000 newspapers. With this scheme, it will be possible to read at 10 o'clock in Milan all newspapers printed at 8 o'clock in Rome. The cost of installation of this kind of plant reaches 3,000 lires ($600) per kilometre, or about $950 per mile. — *N. Y. Evening Post.*

USE OF WHITE-LEAD IN FRANCE. — The Minister of Commerce and Industry has submitted for signature by the President of the French Republic the following decree regulating the use of white-lead for house-painting, accompanied by a report stating that the text has been approved by the Consultative Committee of Arts and Manufactures and also by the Council of State, while the last-named body has for the present declined to sanction total interdiction of the deleterious substance in question. Article 1. In painting shops, white-lead must only be used in the state of paste. Art. 2. The direct use by hand of products with white-lead base is forbidden in house-painting works. Art. 3. The dry scraping and rubbing with pumice-stone of white-lead paint are forbidden. Art. 4. For wet scraping and rubbing with pumice-stone, and generally for all work of white-lead painting, the masters must provide overalls to be used exclusively for the work, and must enjoin their use on the men, having these overalls frequently washed and kept in good condition. All that is necessary to ensure cleanliness must be provided for the men at the spot where the work is carried on. The tools and appliances are to be kept in a good state of cleanliness, but without dry scraping. Art. 5. The masters must have the text of the present decree posted up in the localities where men are taken on and paid. Art. 6. The Minister of Commerce, Industry, Posts and Telegraphs is charged with the execution of the present decree, which will be inserted in the *Bulletin des Lois* and the *Journal Officiel* of the French Republic. — *Journal of the Society of Arts.*

MARTINMAS.—Apropos of Martinmas, Zitella Cocke writes in the Boston *Transcript:* "That St. Martin has supplanted Bacchus in Italy and other parts of the Old World is no doubt true. The god of the grapes and the vintage has been compelled to yield to the humble and amiable saint. Spain is eminently enthusiastic in her celebration of Martinmas, and surely in the northern and mountainous region of this country, St. Martin's summer is as beautiful as poet or artist could dream. Her finest bridge, which is, in fact, one of the most superb structures of the kind in the world, spanning the famous river Tagus, near Toledo, bears the name of San Martin, and it was in the soft, sweet time of Martinmastide that the wife of the architect who designed the bridge stole away from her home at midnight and burned it, because her husband had revealed the secret to her, that upon the very day of its completion he had detected a fault in the construction which rendered the whole bridge unsound, thereby costing him the favor of the King who had so generously entrusted the undertaking to his skill. His despair forbade all hope of remedy, but the wife, with a woman's intuition, knew what to do, and she did it. Inasmuch as the bridge, through this untimely accident, needed rebuilding, the commission was given, of course, to the same architect, who did not make a second mistake. It was rumored that the King heard the cause of the 'accident,' and, with a royal guffaw, exclaimed: 'Capital wife, by St. Martin, a capital wife. I wish every man in my kingdom had so good a one!'"

GAS AS HEAT, LIGHT AND POWER.— The use of gas as a fuel and source of power has made wonderful strides during the last decade, and present indications point to a still more marked advancement in the methods of production and systems of lighting, heating and power supply. The systems of incandescent gas-lighting, so prevalent and popular at the present time, depend for their efficiency wholly upon the heating-power of gas, rather than on its luminosity. Water-gas or producer-gas will undoubtedly be the future heating and lighting agencies, and along the lines of their production will be directed most of the forces of investigation and improvement. The future trend of gas-production will probably be in favor of generator rather than retort gases, which ought to result in purer gases; *i. e.*, gas of a fairly constant chemical composition. — *Mines and Minerals.*

THE SHORTENING OF EYESIGHT IN WINTER. — Experiments in German schools have shown that in October pupils can on the average see letters of a given size a yard farther away than at the end of the winter months. — *Exchange.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, NOVEMBER 22, 1902 No. 1404

CONTENTS.

SUMMARY: —
The Course in Architecture at Washington University, St. Louis, Mo.— Infection of Basement Stories by Leakage from Street Gas-mains. — The Chicago Drainage-canal Case. — Traces of Pueblo Indian Life in Argentina, S. A. — The Memorial Church at Shipka Pass, Bulgaria.—Triennial Prize for Prussian Architects. — The Manufacture of Spurious Furniture. — Utilizing the Water-power of the Lake of Tanay, Switzerland.—Method of Drawing an Elliptical Arch. 57
LABOR-ISSUES IN THE BUILDING-TRADES. 59
PURIFICATION OF SEWAGE. 62
ILLUSTRATIONS: —
Rhode Island Normal School Building, Providence, R. I. — Detail of the Same and View of the Rhode Island State-house. — Stable Building, Cohasset, Mass.
Additional: Detail of Lawn Front: House of E. J. Berwind, Esq., Newport, R. I. — House of Rev. Daniel Merriman, Bay State Road, Boston, Mass. — The Garden Front and the Dining-room: House of Mr. Murry Nelson, Jr., Winnetka, Ill. — Plans and Library: House on Woodlawn Ave., Chicago, Ill.; Il Tempietto: Villa Borghese. 63
NOTES AND CLIPPINGS. 63

WASHINGTON UNIVERSITY, in St. Louis, opens this year its regular course in Architecture, which has been for some time in preparation. The course occupies four years, and is modelled upon that of the other great architectural schools in this country, resembling most, perhaps, that of the Massachusetts Institute of Technology. The Professor in charge of the Department of Architecture is Mr. Frederick M. Mann, who is well known in the profession, and will undoubtedly be a sympathetic and successful teacher. In addition to Professor Mann, Messrs. William B. Ittner, James P. Jamieson, E. L. Masqueray, J. L. Mauran and Thomas C. Young constitute a special committee, which has in charge the management of a Travelling Scholarship, offered to draughtsmen and young architects, under the auspices of the University. By a commendable innovation in the ordinary routine of travelling scholarships, candidates are required to spend the whole winter in work upon six rendered problems, and six sketch problems, after which they must pass a satisfactory examination in construction, architectural history and elementary French. Immediately after this examination, the award of the scholarship will be made, by a jury of three prominent architects residing outside the State of Missouri, three rendered problems and two sketch problems being selected, to be submitted by each candidate. In order to secure uniformity of conditions, as well as to utilize the work of the candidates as far as possible for the benefit of all, it is required that all the competing drawings shall be made in the rooms of the Department of Architecture, which are kept open until ten o'clock every evening for this purpose.

DR. LEDERLE, the President of the New York Board of Health, is rapidly making a name for himself by his energy in studying the public good in his own province. Recently, he determined to see, if possible, how far, and in what way, leakage of gas into the cellars of houses through defective pipes affected the health of the occupants of such houses. In the course of his investigations, his attention was directed to a gas main, two and one-half inches in diameter, in a single length of which, fifteen feet long, there were twenty holes. Naturally, the gas escapes in enormous quantities from such mains as this, and a large part of it finds its way, usually, into the neighboring cellars, the walls of which are often as permeable as the pavement over the pipes. Another way in which gas is said to be brought into buildings is through pneumatic tubes, which are often placed in the same trench, or conduit, with gas mains, and draw in gas from the leaks in the latter, to discharge it into the rooms served by the tubes. As pneumatic tubes, to be operated successfully, must be at least nearly airtight, it is difficult to see how gas could be drawn into them except from a source practically saturated; and the infection of cellars around such a spot would be likely to be much more serious than that carried through the pneumatic tubes. Dr. Lederle is said to be trying to trace an apparent connection between the infection of houses from leaky gas mains, and the occurrence of typhoid fever in the same houses. Of course, no one would expect to find the typhoid bacillus in gas, but the typhoid germ does not usually propagate itself in persons in full health and vigor, and it is very possible that the breathing of air contaminated with small quantities of gas may produce such a depression of vitality as to expose the system to bacterial influences.

THE so-called "Drainage Canal" case, in which the State of Missouri is plaintiff, and the State of Illinois defendant, has come up before the Supreme Court of the United States, and, by agreement, the plaintiff is to have four months to prepare and present its evidence, and the defendant is then to have four months to present its reply. After this, each side is to have fifteen days for rebuttal of the evidence presented by the other. The attorneys for the State of Illinois had petitioned the Court to dismiss the case, on the ground that Missouri had neglected to prosecute its complaint; but it appeared that the Missouri authorities, instead of neglecting the matter, had spent a large amount of money in having analyses made of the water of the Mississippi below the inlet of the drainage canal, as a preparation for presenting its case, and the motion to dismiss it was therefore withdrawn. The testimony offered by Missouri, when the case is formally opened, will be of the greatest importance and interest to the whole civilized world. For many years, engineers and sanitarians have been unable to agree as to whether sewage can be discharged into a river without danger to persons who take water for drinking from the same river at any distance below. Even after the theory that sewage was immediately rendered innocuous by dilution with river water had been abandoned, the great majority of engineers believed that if the sewage was diluted with a certain proportion of water, and then exposed to the air during a flow of a certain number of miles, it was so changed as to lose its noxious properties. As time went on, various mishaps began to cast doubt upon this theory, and, ten or twelve years ago, one of the most eminent of English sanitarians declared that no river was long enough to purify sewage. The terrible cholera epidemic at Hamburg, which was traced directly to sewage in the river Elbe, cast additional doubt upon the river purification theory; and the tendency of science now is to consider that, while analysis may show a rapid decrease of albuminoid ammonia in flowing river water, it does not follow that specific germs are quickly destroyed, or that some of them may not preserve their vitality for a very long time in such water. Positive evidence on this point has not, however, been made public, and the investigations of the experts for the State of Missouri, corrected, if necessary, by those of the State of Illinois, will afford the first important contribution to the knowledge of the subject.

DR. AMBROSETTI, of Argentina, made an important contribution to the recent Congress of Americanists, in a paper describing the remains which still exist in Argentina of a race which seems to have resembled very closely the Pueblo Indians of Arizona and New Mexico. While, however, a remnant of the Pueblo Indians of North America still maintains its tribal organization and its habits of life, the Calchaquis, as the Indians of the corresponding race in the South are called, have totally disappeared, the few who escaped the weapons of the Spanish conquerors having been taken to Buenos Ayres, in the middle of the seventeenth century, where they intermarried with other natives, until their identity was lost. Before the Spanish invasion they seem to have formed a populous and powerful community, living in collective habitations, or pueblos, traces of which are scattered over the plains and mountains through a tract some nine hundred miles long. Although the Spanish soldiers were experts in the art of plundering the poor Indians whom they conquered, they overlooked some of the objects contained in the Calchaquis' pueblos, and Dr. Ambrosetti has collected a large number of gold and silver ornaments, beads of turquoise and shell, weapons of bronze and pottery, decorated with the figures of serpents which play such a singular part in the art of Central America and Egypt, as well as of South America. Among the villages Dr. Ambrosetti found many groups of stones, standing vertically, each a little higher than a man, and carved with a rude human face. These groups are surrounded by rings of stone, and recall the so-called Druidical monuments of Europe. In general, the Calchaquis seem to have been inferior to the people of the

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

Incas in wealth and intelligence, and appear to have formed a community apart from them, living an agricultural life, something like that of the Northern Pueblo Indians, but adopting a scientific system of irrigation which would be beyond the intelligence of the latter. That they were on terms of hostility with their neighbors, even long before the Spanish invasion, is indicated by the care with which the mountain passes leading to their territory were fortified; and it seems not improbable that they may have represented the aboriginal inhabitants of Argentina, who had retreated to the mountains before an invasion of the Incas, and maintained themselves there until the oppressors and oppressed alike were overpowered by the still stronger Spaniards.

ONE of the most sanguinary battles ever fought in Europe is recalled by the dedication of a large and beautiful church at the foot of the Shipka Pass, in Bulgaria. In this pass, the Pass of the Wild Rose, to translate into English its poetical name, was fought, in August, 1877, a battle, which lasted five days, between the Turkish and Russian armies. The soldiers on both sides fought with a heroism which will make their names immortal, and it was not until eighty thousand men had fallen that the Turks gave way, opening the route through which the victorious Russians marched, later, to Constantinople. With characteristic piety, the Russians, after the close of the war, prepared to commemorate the struggle by the erection of a church, which has been carried out by the Russian Government, and presented to the Principality of Bulgaria.

THE Academy of Fine-Arts in Berlin holds every third year a competition of a peculiar kind. Only Prussian architects are admitted to it, and candidates must not have passed their thirty-second year. Persons qualified under these conditions are required to submit plans, elevations, perspective drawings, sections and photographs of some building entirely carried out from their designs and under their direction. These documents are inspected by a jury, which awards to the author of the best a prize, consisting of the sum of thirty-three hundred marks, or about eight hundred dollars, which the winner is obliged to spend in a year's travel and study, at his discretion, the only restriction being that, unless he is familiar with Italy, he must spend a part of his time in that country. As the prize is awarded only once in three years, it does not constitute a very heavy drain upon the resources of the Academy, while it affords a valuable stimulus to young architects to study their early work to the utmost, in the hope of winning such a distinction.

ONE of the English magazines calls attention to the enormous development of the trade in spurious antique furniture which has marked the last few years. Americans, and, especially, American ladies, have a good deal of the passion for articles possessing some sort of historical association which is natural to people of cultivated minds and lively imagination, who see in their own homes very few objects endowed with such interest, and this sentiment, joined with their wealth, not to say their extravagance, and their inability to judge from experience of the truth of the stories told them, makes them easy victims. It is said that the factories of Rouen alone turn out more than a hundred specimens a day of "antique family clocks"; and the manufacture of old furniture is carried on in nearly every city in Europe. The clumsy old tricks, such as that of firing small shot at a chair or table, to give an imitation of worm-holes, have been superseded by more ingenious ones, and only an expert can detect imposition in such matters. In fact, a large business is now done in furniture actually made of old fragments, originally quite unrelated, but put together in such a way as to make a tolerably consistent whole. Even the ancient fabrics, such as brocades and laces, are now reproduced by thousands of yards, and sold in fragments to unsuspecting tourists, at an enormous price. These objects are sold, in many cases, by agents, who call upon the tourist at his hotel, and pretend to be old family servants, or impoverished heirs, who have come into possession of authentic relics of immense value, which they are willing to sacrifice for ready money; while, in the case of furniture, a great deal of use is made, everywhere in Europe, of cottagers, or inhabitants of dilapidated town houses. These persons are furnished with specimens of fictitious antiquity, which they arrange in such a way as to catch the eye of a person passing. Before long, some credulous tourist is tolerably sure to happen by, and to make the fortunate discovery of this ancient heirloom "in the last place where anybody would have thought of looking for it." After an animated dialogue in broken German or French or Italian, the object changes owners, and is carried away by the triumphant victim, to be immediately replaced by another from the same manufactory. Even with antiquities of a more ambitious class, imposition is the rule. At least two establishments exist, or did exist, not long ago, in Switzerland, which carried on a flourishing business in the manufacture of "relics of the lake-dwellers," consisting of stone spear-heads, and other objects, of course imitated from those in the museums. In the same way, Greece, Italy and Egypt are flooded with spurious "antiques," many of which are made with such skill as to deceive even experts. The fact that the Boston Museum of Fine-Arts has recently removed from its shelves, as spurious, a considerable number of Greek terra-cottas, which had been exhibited as genuine for many years, shows that, where the most eminent judges are occasionally deceived, the amateur collector is practically defenceless.

WE have already mentioned the fact that the highest waterfall in the world was to be utilized in driving turbine wheels. The installation is now complete, and *Le Génie Civil* gives an interesting description of it. The water is derived from a little lake, the Lac de Tanay, situated on the side of a mountain at the upper end of the Lake of Geneva, about three miles from Bouveret. The mountains in this part of the world are steep, and the Lake, or, rather, pond, of Tanay, although so near the Lake of Geneva, is nearly four thousand feet above it. The Lake of Tanay covers something more than one hundred acres, and, by building a dam, can be increased in extent to nearly two thousand acres. A brook runs out of it, with an average flow of about eighty gallons per second; and, with such reservoir capacity for maintaining an even flow, it is not surprising that the idea of utilizing the brook should have attracted the attention of engineers. The first step was to build a power-house at Vouvry, a little station on the Bouveret-St. Maurice Railway, near the foot of the mountain, the upper valleys of which contain the lake. The difference in level between the lake and the power-house is about thirty-one hundred feet, and it was calculated that, with this head, one quart of water per second would give nine and one-half horse-power at the turbines, with all necessary allowance for friction and leakage. At this rate, the little brook would give a constant force of more than three thousand horse-power, but, by increasing the storage, by means of a dam, this could be greatly increased, and the pipes and valves, as well as the plans of the power-station, were arranged for a constant output of ten thousand horse-power. For the present, however, only four machines, of five hundred horse-power each, have been installed. The water is taken from the lake by a tunnel, a thousand feet long, with a slight inclination, and a branch from this tunnel serves as an overflow. From the tunnel the water is carried partly through other tunnels, and partly through pipes, to the power-house. The pipes are of Siemens-Martin steel, welded by hand, the joints being held together with rings and bolts, and kept tight by washers of copper. For the present, it is intended to use the power for the production of electric light, but it can easily be utilized for other purposes, if necessary.

THE *Builder* gives, in a letter from a correspondent, a very easy and useful method of laying-out an elliptical arch. The width and height of the proposed arch being given, a rod is cut, equal in length to the sum of the rise of the arch and one-half the span; and a notch is cut on the rod, at a distance from one end equal to the rise of the arch. A line is then to be drawn vertically through the middle of the proposed arch, and another horizontally across it at the springing line; or a strip of wood may be secured in each of these positions, so that the ends of the notched rod may rest against the strips, and move upon them, Placing the notched rod upright, in contact with the vertical strip, and holding a pencil in the notch, the rod, keeping the pencil in place, is to be moved along the sticks, so that one end is constantly in contact with the vertical stick, while the other is constantly in contact with the horizontal stick. The pencil will then describe one-fourth of a true ellipse, or one-half of a truly elliptical arch of the height and width desired; and, by shifting the rod, the other side of the arch may be drawn in the same way. For the use of plasterers, carpenters and decorators, who often have occasion to lay out elliptical arches of a given height and span, and who can always find three sticks and a pencil, this method is the readiest and simplest that we have ever seen described, and our readers will do well to keep it in mind.

LABOR-ISSUES IN THE BUILDING-TRADES.[1]

THE practical student of labor-issues, no matter in what field he may investigate, is confronted with an almost universal condition — namely, a failure upon the part of the employer to act in the matter of labor as he does in all of the other relations connected with his business. He takes into account the factors of location, of transportation, of climate, of supplies, of cost of material of every name and nature that affect the business in which he is engaged; he assures himself that the parties he purposes dealing with are responsible, he fortifies himself by contracts of agreements so that on these points he may be reasonably assured that he can carry out the contracts he enters into, but he omits to protect himself in the most vulnerable part; like Achilles, he is practically out of danger, save at one point; unlike Achilles, however, the vulnerable part is not remote and insignificant, but in the most conspicuous position and one most open to danger. In spite of all the lessons which the experience of the last fifty years in this country, and a much longer period in the older countries, has offered, employers, as a rule, still go into the market and contract to "do and perform," without reckoning with labor.

The result from this blind policy, or lack of policy, is hardly different from what might fairly be expected: the wide-open gates invite invasion, the unprotected conditions suggests methods of attack, and a strong advance is made by those who see their opportunity and take it.

It is perfectly safe to say that the movement in the social and business world during the last hundred years, which has become known, somewhat too comprehensively perhaps, as "the labor movement," has not concerned, and does not concern, itself with the interest of employers, but is almost wholly addressed to gaining advantages, or supposed advantages, *from* employers and *for* a certain section of those engaged in the world's work, namely, those who work for wages. It may also safely be asserted that a large part of the objectionable features that have resulted from this labor-movement are due to the failure of employers to realize and act upon a common rule of business, namely, that if one does not look out for himself there will be nobody to look out for him. In other words, had employers recognized that labor-issues are as much a part of their concern as of those who are employed by them, and have participated, in legitimate and proper ways, in an effort to systematize and better the conditions under which labor is performed, the dangers which now threaten would have been largely modified, if not wholly avoided. The crux of the whole matter is this: that a field which is indisputably a joint possession has been cultivated exclusively by one party to the equation, with the inevitable result that the crop grown in that field is unsuited to the joint uses of the two parties; and as they *must* live upon the product of the field, and must live *together*, the unsuitable crop distresses and weakens each instead of giving life and strength to both.

What has happened is simple enough in its operation, but terribly complex in its results, and the whole world, awakened at last to the situation, exclaims with one voice that the labor-problem has become the most important and the most difficult of all problems.

These general statements apply to all lines of work, at all events to those lines where any considerable number of individuals are concerned, and, with the increased and increasing facility of communication and of bringing widely separated *small* groups into federated relations, thus making a most considerable interest, there are few lines of work which, at the present time, are outside this general condition of associated action.

The difficulties and dangers inherent in all associated effort are greatly increased by federation, centralization and concentration. Principles which in themselves are, perhaps, simple and admirable become difficult of manipulation and dangerous in application when many of varying nature are put into a crucible with the purpose of making them mingle into a consistent and workable whole.

The temptation is great to exercise undue power and to *force* by these measures of concentration that which can only *safely* come by growth, and the danger in the process is greatly enhanced by the fact that there are no trained minds available to safely direct and control the varied interests thus brought together.

There is no evidence that any one has yet been developed, and it is hardly conceivable that any one will be developed, capable first of comprehending and then of controlling the infinite complexities which cannot but be present in ever varying character in the aggregations of associated interests represented in the large federated or concentrated bodies. It is beyond all experience in Nature and Life to expect such capacity, and yet that is the condition with which the world is confronted, resulting from effort of a one-sided character, unrestrained and untempered by the application of those balancing forces which alone can create and maintain equilibrium.

The labor-problem comprehends three distinct interests — the interest of workmen, the interest of employers, and the interest of the public. It is usual to affirm that in all movements resulting from the agitation of labor-issues the interest of the workman and the interest of the employer are primary interests, almost paramount, while the interest of the community is collateral; but it is not at all certain that this relative position and definition is correct. The community, as the consumer of all products and the customer for all interests, is beginning to claim that its right cannot be ignored, and may *insist* that it shall be first protected.

The movement of the interests, however, has, up to the present time, been largely in the order in which I have first named them — workmen, employers and public, and the character of these movements stated in the same order are aggressive, defensive and passive.

In the evolution of this social economic problem these movements are, in a sense, but natural — that is, they may be expected to occur as stated; but it does not follow that they may not be otherwise ordered, or that they cannot be replaced or adjusted through a wiser, saner process, in a different order and character, resulting from clearer comprehension of the true relation of these interests to one another.

It is easier to comprehend that the wage-worker was first stirred to activity, for it is he who will receive the most immediate and direct benefit from any improvement in conditions. At first he may have groped rather blindly for the changes which he as blindly hoped for, but the initiatory movement could certainly not have been expected from any other quarter, and the groping and blindness were soon supplanted by positive and clearly conceived action. From groping uncertainty to arrogant aggressiveness the stages have been infinitely varied and divided, and though the results in many of their manifestations have been, and are, familiar as household words to this assemblage, it is essential to the purpose of this paper to describe the principal route which the labor-movement has followed and indicate its growth from feebleness to uncontrolled and, apparently, under the present *régime*, uncontrollable power.

In a general way, the movement may be described as following the same route as natural forces, namely, the line of least resistance; for although there has never been a time when barriers have not been set up against the movement, they have been so superficial in character, so weakly unintelligent, that they have almost contributed to the rapidity, if not the smoothness, of the passage.

This line of least resistance has been the employer.

Although the community has always in the last analysis to foot the bill, the demands of labor have never been made directly on the community, but on that servant of the community, the employer of labor, who acts, in a sense, simply as the community's agent, but in such fashion that he ofttimes is subjected to almost all the difficulties and more than his share of the risk and ultimate loss. I shall hope to show before the conclusion of this paper that the time is fast approaching, if not already come, when a reversal of this process will be established, and the community will make its demands on both workmen and employer in a very direct manner, using its power to compel observance of rational rules of conduct in these labor-issues, which have been so radically ignored in these latter days.

Under present conditions demands are presented to, and attacks are made directly upon, an intermediary, who practically engages to deliver either to some specific member of the community or to the community in a more general way certain values which are the joint product of his labor and the labor of those whom he assembles, controls and directs in the process of production. This intermediary, the employer, is, under our present social status, indispensable. While it is possible that under some social polity which the world has not yet practised, a way may be found to dispense with the employer of labor, a way by which every one may work directly with and for the community, it is unquestionably true that such a socialistic condition has not yet arrived. But it is too plain to escape notice that in all the movements made by labor through its organized forces and under the conditions which I have described as existing, the principal effort, tendency and result is to injure this same indispensable intermediary — the employer. It is of course true that when an injury to either workman or employer occurs in these constantly increasing struggles, the community ultimately bears the burden, although it is often so thoroughly distributed that little notice is taken, but the aim thus far recognizable in the history of labor-movements is to catch the employer on the hip and make him bear, vicariously, the burden; a burden which, in this concentrated application and through his inability to escape or shift it, temporarily if not permanently cripples him. He is in the line of least possible resistance apparently, and, willy-nilly, he must take the consequences — at all events, he has taken the consequences thus far, and it is generally conceded that the employer's lot, under existing conditions, is not a happy one.

What is the character of this force which makes itself felt so widely, and often with such brutal disregard of individual rights, either of fellow-servants of same degree or those other servants whose work is equally indispensable with those who work for wage? Let us try and discover and define!

The study of associated effort is most interesting, and would be more so were it not for many painful stages through which one must pass in experiencing the character of this force, and one cannot study properly a practical, concrete question like this without experiencing its manifold vexations and suffering from its sharp pinches.

A principle in itself may be most admirable, and an individual in making application of that principle may be as admirable as the principle and ennobled in its application, but let a group of people attempt to operate the principle and almost invariably we have an illustration of the old adage, "Too many cooks spoil the broth."

A curious psychological change takes place when the minds, the souls, of men mingle.

[1] An address by William H. Sayward delivered at the Thirteenth Convention of the National Association of Builders, Washington, D. C., October 28, 1902.

Six or sixty men may individually be capable of dealing with their fellow-men on a given principle with practically the same result, but let them unitedly attempt to operate the principle and it is an altogether different matter, and that which should be a healing and helping becomes a wounding and hindering. I do not wish to convey the idea that this is peculiar to those who are connected with labor-issues *per se*, but rather that, whatever the kinds or conditions of men, their associated effort is full of dangerous possibility however clear the principle which actuates them may be.

In the first place I think we may say that the character of this force is selfish. However altruistic may be the purpose — and almost universally the claim is made of an altruistic purpose — the force as applied is eminently selfish. It is primarily an attempt to gain certain advantages, or supposed advantages, for certain chosen ones, without special consideration, or, rather, concern, for those who may be outside the artificially-fixed boundaries of the sect; but beyond this, and by far the most threatening aspect of the movement, is the deliberate intent to deprive those who may be within the charmed circle, or not in sympathy with its doctrines, of those privileges and rights which, until these notions were promulgated, it was supposed all human beings had as a natural inheritance, and which our American code describes as "life, liberty and the pursuit of happiness." This latter-day cult says you may have life, liberty and the pursuit of happiness only if agreeable to us, and provided it does not conflict with views we may hold, even though we do hold them under no authority from the State and exercise them regardless of the will of the community. The cult says, we are a power outside of the power of State or Nation, and may, and will, traverse all regions on a plan of control which the community cannot successfully interfere with through any of the recognized instruments which usually have compelled the observance of law and order and which have usually been sufficient to uphold the principle that the rights of the individual shall not be interfered with by powers outside the laws of the land.

The character of this force is, secondly, covert, disguised, evasive. Its primary operations are in secret, and its designs are hidden.

Thirdly, its effect is destructive rather than constructive, and, fourthly, its result is to keep the whole body-politic in a state of disturbance which makes sane and safe conditions practically impossible.

I believe this to be a reasonable statement of the character of this force which has been manifesting itself with ever-increasing significance for the last fifty years and with astounding power and alarming effect during the last dozen years, particularly in the United States.

Having thus briefly described the route which has been taken by the labor-movement and shown how it has naturally assumed authority and clothed itself with power outside all recognized boundaries, I wish to emphasize that power acquired and exercised under conditions where no balancing influences operate is certain to become despotic, and eventually harmful to those who exercise it, as well as to those against whom it is directed; and that we have no right to expect any other result when such conditions are permitted.

I have thus far treated labor-issues generically, and this method might be continued to the end of the discussion which I wish to give to the question, but we are here as builders, and therefore it will be wise to now address myself to those specific manifestations of labor-issues with which we, as builders, are familiar, and endeavor to show how we may modify our attitude so that more satisfactory conditions may prevail in our special business.

What I have said thus far may be considered as introductory to our special interests, and may serve to show that while we have troubles of our own, they are of the same class and character, arise from the same causes, and operate through the same channels as those in all branches of business where labor-issues are a factor, and I hope my conclusions as to what we may, and, I believe, *must*, do in our special field may seem also feasible in any lines which are subjected to difficulties common with ours.

The business of building in any or all of its branches is peculiarly open to disturbances arising from agitation of labor. This is partly the result of the preponderance of a lower grade of service than in some other lines, for instance, the finer lines of manufacture, which invite a perhaps higher intelligence than the ruder, harder tasks incident for the most part to building-work; but by far the greater influence which makes the building-business more liable than many others to these harassing troubles arises from the many distinct trades involved in the production of a single piece of building-work. The simplest structure, the least important undertaking in the building-line, calls into operation, on the premises, many distinct trades, all of them practically essential, the absence of any one making a gap which cannot be filled by any substitute, while in the more elaborate undertakings so common under the demands of modern business or domestic life, the trades which contribute to complete such buildings sometimes number more than two score. This great diversity, this specialization, which splits up building-work into so many parts, with a distinct employer and a distinct set of workmen for each part, invites disturbance, by the ease with which the whole machinery of operation toward a completed structure may be blocked. A portion of the work which in its relation to the whole may be absurdly insignificant may become the focal point upon which all the rest depends, and a labor hold-up in that trade may, in practical result, operate as effectively upon the whole building as in the relatively larger trades.

The sympathetic movement, of course, becomes peculiarly significant in the building-business, whether it be operated upon a single building, to bring either a general contractor or a sub-contractor to terms, or whether it be applied to a general group in a community, to bring all to terms.

One of the newer and most trying developments in later years is that arising from the conflicting claims of rival Unions in the same trade; with no grievances against the employer by either of the rival bodies, their grievances against one another are made to result in more injury to the employer, an injury which even the most easy and conciliatory of employers can find no escape from.

No doubt, many of the employers present here can furnish a long list of actual occurrences illustrating how the diversity of occupations grouped under the one general head, building-work, produces a danger which perhaps does not exist in such extravagant manifestation in any other calling.

From the character of actual disturbances that are taking place in the building-business under the present *régime*, one can readily understand that the opportunity for disturbance is practically limitless.

It seems to me that what I have said, coupled with what you, as practical men engaged in carrying on the various branches of building-work, know from your individual experience and observation, indicates beyond question that, as the case stands at present, the relations of employer and workmen in the building-trades are far from ideal, indeed they are full of danger as a building-proposition, not to say anything of the unsettling, undermining and, possibly, destroying of inspiration, satisfaction, delight in working out problems of construction or decoration upon which depends the development of power and ability to these ends in both employer and workman.

I would like to discuss somewhat fully this demoralization of purpose in work, which flows very directly from the maladjustment of relations of employer and workman, but it is more purely the business aspect of the question which engages me, and which is enough for the reasonable limit of a single paper. I will simply say in passing, however, that there is much in the attitude of antagonism of these two elements that tends to breed deterioration in quality of work; the workman who is constantly urged through unwise and inflammatory counsels, in his organization or elsewhere, to seek solely what he can get, the *uttermost*, without much consideration as to what he shall give in exchange, gradually loses all other purpose, and, by the inevitable working of the law of cause and effect, the question of quality in what he does drifts, without his deliberate intent, into the background and finally disappears; while the employer, gradually ceasing to expect that which he is forced to believe he cannot get, lapses into the same attitude of get-as-much and give-as-little as possible.

Under such conditions as these, the ability to execute becomes gradually a lost art. This is no fairy tale, as many of you can testify, who already find it difficult to secure skilful hands to manipulate stone and iron and wood and all the materials for building into structures and things of usefulness and beauty.

The business aspect of the situation is most appalling.

I can conceive of no more threatening condition than that which grows more and more impressively evident as ultimately possible with every new phase of the labor-problem now rapidly developing in every direction.

While the disturbances which quickly reach the individual, so that he personally feels their sharp pinch, like the coal strike, for instance, appeal glaringly to the public and result in volumes of wise and unwise discussion, mostly from those who have no practical experience in the fields of work involved, who "never set a squadron in the field nor the division of a battle know" more than a spinster, the disturbances that take place in the building and other trades are none the less destructive, though the public, from the smallest and most insignificant consumer up to the President, be not keenly on the alert and insistent that "something be done" to ameliorate the conditions.

Labor-issues in the building-trades are fully as difficult to meet as those of any business, not excluding the business of mining coal; indeed, I think more so, and, as respects the extent or volume involved, either in money values or number of workmen affected, there is but little question that it — the difficulty — is equalled in few callings. I have previously indicated how the problem with us is complicated by the number of trades that are inextricably interwoven — the *completion* of a building being as dependent upon one as another — and I wish to emphasize the point now, as the action which I shall immediately recommend is made more imperative by the complexity referred to. The building-business is not, like mining or manufacturing, concerned principally with one general movement and one product, but is made up of many independent parts, independently conducted.

The independently conducted parts of a whole movement, as in the building-business, make possible a pressure upon the whole through some comparatively insignificant part. This interdependence is suggestive. It suggests weakness, and strangely enough, it suggests strength — and most of all, it suggests obligation. It suggests weakness because insufficiency in any one part blocks the wheels of all parts; and it suggests strength because under intelligent direction, based upon a proper principle of action, all parts may act together to defend any one or more parts from attacks that may be instituted against them. The suggestion of obligation is the strongest, because each part may not, with a proper sense of its duty to the other parts, pursue a course which may result in injury to all,

and for this reason, in the building-business more than any other, each of the blended trades should, in these labor-issues, feel its obligation to so arrange its affairs that others may not be made to suffer on its account.

Three compelling reasons exist for the adoption of a consistent policy as regards labor-issues in this business which immediately concerns us.

1. *Obligation* of each part to every other part.
2. *Weakness* which prevails most peculiarly in the building-business where there is no common policy.
3. *Strength* which is peculiarly available for the building-business when a common policy is positively adhered to.

Now, what policy *is* possible?

It would be a useless consumption of your time and mine, if this discussion should not bear fruit in the shape at least of a suggestion of possible remedy for what I believe to be a most serious mistake in the attitude of employers generally toward the labor-problem, and especially *our* labor-problem.

I am of the opinion that the attitude of employers generally in all kinds of business where labor is an issue should be radically changed. Instead of holding themselves as they too often do, either indifferent or opposed to organizations of workmen, I feel that they should take the matter up with liveliest interest and determination and insist that workmen in their various trades *shall* be organized; that they, the employers, will have no settled policy with them until they be organized; and organized in such fashion as will produce proper, and therefore safe, bodies to be recognized; that they, the employers, will coöperate with the workmen to this end, and that the organizations thus formed will be treated with in fullest, freest and most open manner, so that agreements shall be made at seasonable times of the year, governing terms and conditions for each coming year, or series of years, these agreements to be made public so that the community may know what the contract is and where to place the blame if contracts are not kept. Such a policy of participation will render it practically impossible for the affairs of labor-organizations to be one-sided or to drift into the hands of unworthy or dangerous men. The one safeguard that workmen's organizations need, to make them wholly valuable, is the coöperation of employers. I will not say they are entirely helpless without this coöperation, but I may say with truth that this coöperation will be their greatest defence against those evils which now most glaringly assail them and so often discredit them in the eyes of the public. At all events, an intelligent recognition by employers of the fact that they are a part of the labor-problem, that no inattention or discrediting on their part can alter the fact, but, on the other hand, that frank and complete co-operation insisted upon as, not only a duty, but a right, will furnish the element so greatly needed to balance a machine which often has seemed ill-adjusted for the work it aims to accomplish.

A policy of this nature, persistently and patiently followed, will put the employer in the same relation to the element of labor that he is to the other elements which, as I pointed out in the beginning of this paper, he feels it imperative should be fixed and stable in order that he may secure in his undertakings.

Now, what are the difficulties?

There are many, but none, I believe, so great that they may not be surmounted.

In the first place we have the difficulty arising from the prejudice which an untenable attitude and unwholesome action on the part of labor-organizations have engendered, and from the fact that in many cases their leaders have been irreconcilables and wholly unworthy of the important offices they have been permitted to fill; but I wish to make my belief entirely clear, that this prejudice will vanish when coöperation modifies the action taken, and puts that power of selection back into the hands of the conservative rank and file which has ofttimes been wrested from them; for be it also clearly understood that when I say that "labor must be reckoned with" I do not mean any and everything which presents itself as labor, or as a representation of labor — it may be a counterfeit presentment — but until employers put themselves in a position where they can participate in the issues, they cannot tell the true from the false and cannot help the true to oust the false. Employers must get near enough to the problem to be able to understand the difficulties which the honest and true men in labor-organizations have to struggle with, and it is only by so doing that they can help the good element to overcome the dangerous and bad. Wherever you find a labor-organization which constantly assumes the attitude and acts upon the assumption that the employer is an enemy to be attacked — alas, this is too often the sentiment which prevails — there you will find an organization which has drifted away from wise counsellors and into the hands of demagogues and dangerous men, and that is the organization which, more than any other, needs the help of the employer to rescue it from the danger into which it has fallen; — for an organization which fosters this sentiment of antagonism widens the breach, increases difficulties and deteriorates character. It needs help. Shall it be denied?

On the other hand, I wish to express with equal emphasis that when you find an organization of employers which goes no deeper into the labor-problem than to resist indiscriminately all measures sought by labor, and fails to address itself to the more significant and promising effort of coöperating with labor in an intelligent way, so that labor may be saved from its self-inflicted errors — and, alas, too many organizations of employers and too many individual employers seem to have no clearer vision of their opportunity and duty than this — there you will have an element which tends to increase rather than diminish the conflict between capital and labor, that conflict which has no sane reason for existence.

Another difficulty to be overcome is that sentiment so often expressed by employers that they will not treat with unions *until* they reform themselves and become proper bodies to deal with. This must be met by showing that the chief hope of reform lies in the introduction of that element which the employer alone can furnish and that to demand that the reform must be effected *before* this element be introduced is of the same nature as the restriction placed by a mother on her child, when she insisted he should not go into the water until he had learned to swim!

Another, and one of the greatest of difficulties in the way of setting up new and more wholesome relations, is the unfortunate attitude which unions have assumed toward non-unionists, and which they seem disinclined in most instances to either abandon or modify.

If we put ourselves in their places, I think we may readily understand how this feeling has become deeply rooted. Human nature is about the same whether it be of one condition of life or another, and we are all liable to become prejudiced against those who persistently oppose us. We must grant that the great bulk of those who are members of trade-unions believe in them thoroughly as their only hope for betterment of conditions, and in this view our intelligence and our fairness compel us to concur, even though we may severally condemn some general principles of action and many specific acts — for it is plain that employers or the public generally would not of their own motion have brought about the changes which the unions have secured — and we must also admit that non-unionists have participated in the general improvement. Is it not easy, therefore, to understand why the union man, as a rule, looks with contempt upon the man who sneers and flouts him, refuses to pay his share of the bill of expense, and yet takes all the gain that others have won?

It is easy of comprehension, I say, this deep-rooted antagonism of the union man against the non-union man, and yet, twist it how we may, there is a still deeper rooted feeling which compels us to say that, however galling it may be for a group of men to see others profiting in an increase of wages or by a reduction of hours secured through their concentrated efforts, *the inherent right of the individual to work or not to work must not be interfered with.* This principle is so based on the very foundation of our faith in independence of action, that independence for which this country stands, that it cannot be successfully assaulted; therefore it is the height of unwisdom for labor-unions to make it an issue. As has recently been well said by a sociological writer, "unions have rights to be as exclusive as they please and are within their rights so long as they control only the labor and movements of their own members, but they pass the limits of right and common justice the moment they use their organizations, either directly or indirectly, to exclude even one human being from the chance to make his own livelihood in his own way." This right to make a livelihood is inalienable in every human being so long as he does it within the law, and any man or any group of men who set themselves up against it injure their own cause by so doing. They injure their own cause also by setting up an argument which, if tenable at all, is equally tenable against themselves, for if the non-union man cannot, without interference, pursue any lawful course under any agreement or condition agreeable to him, then the union man must submit to the same injustice. It is time for unions to drop this most unfruitful endeavor; it is time for them, for their own good, to quit claiming that *they* have the right to work or not to work, and then, by the measures they adopt or support their members in adopting, practically deny that right to others.

It is my thorough conviction that the quickest road out of this folly is to coöperate with unions to help them, among other things, to see that this non-union opposition is wholly untenable; it will then soon cease to be a factor. As the attitude of resistance has created evils and dangers, so will coöperation banish them.

If employers abandon their distrust of unions and enter into friendly business relations with them, unions must abandon their distrust of non-union men and concede the right of their fellow-workmen to join, or refrain from joining, their bodies. If a labor-union is recognized as a fit and proper representative body to act for the class — and it must be fit and proper and representative or it cannot be dealt with — then all is gained which it may properly seek; and, by the abandonment of its attempt to coerce people into joining, it opens the surest road for accession to its ranks of those who may *come* of their own accord, but *won't be driven.* Relieve the unions of unworthy methods (and coöperation by employers will accomplish this more quickly than anything else), and those who now object to joining will be much more ready to do so, and if they still stay outside and no notice be taken of them, it will soon be demonstrated that they are entirely harmless, because they have no effect. When employers and employés take each other mutually into confidence and thoroughly discuss matters of mutual concern, antagonism to labor-unions, to employers of labor and to non-union men will soon disappear; and I further believe, and my belief is based upon actual experience, that if the dropping off of non-union opposition be made a prerequisite of recognition, it will be dropped without hesitation.

Two minor difficulties should be mentioned. One is the trouble connected with joint-committee work, which every employer holds as

a bugbear, and the other the claim that labor-organizations should be incorporated so that they may be held financially responsible for their acts, even as the capital of employers is the basis of their responsibility. As to this last feature, I must confess that I see very little real increase of responsibility, such responsibility as is argued for, financial responsibility, through incorporation, unless the capital of such corporations should be very great (a practical impossibility) and made available only for damages under broken agreements; but I *do* think that employers and workmen alike should seek to give their respective organizations some legal status which should result in making them subject to removal of rights granted under State charters when failing to adhere to agreements, or causing stoppages of work, or creating interference with privileges and rights of others. As to the objection that any form of coöperation entails trouble, I can only reply that this is a most unworthy plea; better any amount of trouble to defend ourselves and the community from the harassment and larger trouble which is inevitably connected with strikes and lock-outs.

In summing up it may be said that in labor-issues, either for the building-trades or other lines of work, these intricate and involved matters will not take care of themselves; they cannot safely be entrusted to *one* of the interested parties alone; *both* parties must have equal concern, must act *jointly*, not only in their own interests, but, in effect, in the interests of the community.

This being done and agreements formally made and legally entered into, if *contracts* are then broken it will be *penalty*, not *arbitration*, and the community will be the chief factor in imposing the penalty.

Now, in conclusion, I wish to point out what seems to me a peculiar advantage for the building-trades in carrying out this policy, showing, as I have previously indicated, the strength given by the very conditions which primarily seem a cause of weakness. It will be remembered that I endeavored to show that the diversity of trades involved in each and every building-operation, each trade standing by itself, with a distinct employer and a distinct set of workmen, gave opportunity for almost limitless interference; in some cases a small and comparatively insignificant trade blocking progress of work as effectually as a larger trade. This may be turned to advantage by so concentrating the action of employers that any strike in any single trade, even on the work of a single employer, shall result in a lock-out of all trades by all employers.

This is coercive action, and it should be the study of employers to avoid it. But it would be legitimate under certain conditions which I will endeavor to indicate, in describing specifically how I think these labor-issues can be most effectively met on the lines of the policy I have been discussing.

I should begin by having those employers in the various building-trades, the best, the most responsible in each branch in every community, united together for the specific purpose of dealing with labor-issues. I should have this central body, acting in the general interest, at a seasonable time in each year, issue a call to all organizations of workmen in these various trades, requesting that they formulate their desires as to wages, hours and general conditions for the coming year, and transmit them to the central employers' organization, this latter organization committing itself to laying the desires of the workmen thus expressed before the employers' organizations in each respective trade, and engaging still further to bring about agreements between the employers and workmen through joint conferences. All conferences to be upon a uniform plan and all agreements to be under the observation of the central body, in order that there may be no conflict in the terms and conditions of the various trades.

These agreements being effected and made public, so that the community may understand exactly what has been done in its interest, the central body will then be in a position to demand and secure observance by both parties of the terms of the agreement.

For instance, should any branch be embarrassed by stoppage of work in apparent violation of the agreement, the central body will immediately take it up and make public investigation and fix the blame and penalty. Should the blame be upon an employers' organization, it would have to withdraw from the position taken, or lose affiliation with, and the support of, all the rest of the central body; a serious matter. Should the blame be upon a workman's organization it would have to withdraw from the position taken, or the central body would at once cause all work to be stopped in all trades; an equally serious matter, and one which would speedily end the recalcitrancy of the guilty organization.

If it be too difficult to get a central body thus effectively organized, the same thing can be accomplished by the most prominent general contractors banding themselves together for the same purpose and with the same policy of action. In some respects this is the more attractive form, inasmuch as it limits those who must be in harmony to a much smaller number. But, in any event, this line of action gets all its strength and value upon setting up preliminary agreements to settle all matters of mutual concern by and through joint committees, these joint committees to formulate working rules under said agreements.

With these agreements existing, it will be hard for either party to evade the penalty which breaking of the contract will bring, hard for the guilty parties to avoid the just condemnation of the public.

But, in my opinion, and this opinion is based upon many years of experience, the discipline spoken of will rarely, if ever, have to be applied, for agreements fairly entered into and made public are seldom violated.

I have one word more and a suggestive one.

I received a letter last week from one of our good builders, a man of large experience and extensive business operations, a letter in reply to an urgent request from me that he be present and discuss this most important topic. He wrote, "I am sorry. I should like to be with you in Washington, but I am too much occupied with actual business to spare the time."

Ah, my friends, until employers realize that the labor-problem is as much "actual business" as any part of that "business" which seemingly demands their whole attention, they will fail to take those steps which the old adage comprehended when it declared that "An ounce of prevention is worth a pound of cure," and they will go on as they have in the past, blunderingly refusing to protect themselves and honest workmen against the dangers that threaten, and permitting bad men and measures to obtain control.

PURIFICATION OF SEWAGE.[1]

HERE is, perhaps, no more difficult problem to be solved than the successful purification of sewage, and certainly nothing has given so much hope of a satisfactory solution of the difficulty as the recent experiments which have been conducted on bacteriological lines. In the past, many methods have been tried with more or less success, but none have been supported by scientific investigation to the extent accorded to this system. Exhaustive experiments have been carried out on bacteriological lines in many towns in England, especially in Exeter, Manchester, Leeds, and, under my own direction, at Leicester. The particulars and results of the Leicester experiments were fully set forth in the report I prepared thereon, and largely embodied also in the evidence I had the honor of giving before Lord Iddesleigh's Royal Commission on Sewage Disposal. The workers in the bacterial purification of sewage have become very numerous, but one may fairly mention broadly such distinguished men as Klein, Houston, Frankland, Roscoe, Woodhead, Parry Laws and Andrews, Dibdin and Thudicum, Clowes, Dupre, Adney, Rideal, Scott-Moncrieff, Waring and Ducat, and the well-known eminent officers of Lord Iddesleigh's Commission.

Much credit is also due to Mr. Cameron, the late City Surveyor of Exeter, for the untiring energy and ability with which he has devoted himself to his now famous idea of adapting to modern bacteriological practice the septic action which has for ages past prevailed in the old and familiar cesspool, but with this difference, that, although some advantage was derived from partial liquefaction of solid matters in those cesspools, they were a source of great danger to health from defective design and construction and from their close proximity to dwellings and sources of drinking-water, and the offensive overflowing liquid therefrom dangerously polluted the neighboring ditches and brooks; while Mr. Cameron's septic tanks, with his excellent automatic appliances, are so designed, arranged and located as to effect a large amount of liquefaction of suspended matters without the drawbacks and dangers peculiar to the old cesspool. The effluent from the septic tanks, which is usually then treated on bacteria-beds on the intermittent-contact system as introduced and developed by Dibdin, is passed through one, two, or three beds successively, according to the strength of the sewage, in order to reach the necessary standard of purity. The continuous process of slow filtration through bacteria-beds is now also much advocated by some; it is really the old system of filtration, but adapted to modern practice. It has not yet, however, made such successful headway as the contact, or intermittent, system.

Broadly speaking, the respective artificial bacterial systems, apart from land treatment, which are now practised may be grouped as follows: —

Ordinary subsidence-tanks of comparatively small capacity, followed either by contact-beds or continuous filtration in beds; open or closed septic tanks, followed by contact-beds or continuous-filtration beds; contact-beds or continuous filtration alone.

In some towns where the trade liquids render the sewage very stubborn to treatment, some preliminary chemical precipitation, in conjunction with subsidence-tanks and contact-beds, or continuous-filtration beds, has been resorted to. These artificial processes are defined and dealt with in detail by the present Royal Commission.

There are several combinations of these systems which cannot be done justice to in the scope of this address; but from my own experiments, extending over a period of thirteen and a half months, treating volumes of 60,000 to 467,000 gallons per day by seventeen different processes, I have been led to certain conclusions, which I will briefly refer to, viz: —

That neither contact-beds nor continuous-filtration beds, without previous treatment of the sewage, will be permanently successful unless the sewage is extremely weak and largely free from matters in suspension.

That open or closed detritus, or subsidence, tanks, with a capacity of about one-sixth of the dry-weather flow per day, in conjunction

[1] Extract from the Presidential Address of Mr. E. George Mawbey at the Annual Congress of the Royal Institute of Public Health.

with first and second and, where necessary, third contact-beds, effect a thoroughly efficient purification, and in these experiments gave, with two contact-beds, an average purification of 83 12 per cent in albuminoid ammonia, and 90.15 per cent in oxygen absorbed, at 80 degrees Fahr., in four hours, the average strength of the crude sewage being 1.2481 grains per gallon of albuminoid ammonia, and 7.5929 grains per gallon of oxygen absorbed. The same process, but with the addition of a third contact-bed, gave an average purification of 86.74 per cent in albuminoid ammonia, and 91.32 per cent in oxygen absorbed, the average strength of the crude sewage being 1.3641 grains per gallon of albuminoid ammonia, and 7.8160 grains per gallon of oxygen absorbed.

The experiments with the use of a closed detritus tank, followed by a closed septic tank, and then double contact beds, gave an average purification of 79.91 per cent in albuminoid ammonia and 89.72 per cent in oxygen absorbed, the average strength of the crude sewage being 1.0094 grains per gallon of albuminoid ammonia and 7.2152 grains per gallon of oxygen absorbed; and this same process, but with the addition of a third contact-bed, gave an average purification of 83.68 per cent in albuminoid ammonia and 89.64 per cent in oxygen absorbed, the average strength of the crude sewage being .8837 grains per gallon of albuminoid ammonia and 7.2019 grains per gallon of oxygen absorbed. In these last two experiments, the volume treated in the septic tank for each twenty-four hours was equal to one and a quarter times its capacity in addition to the detritus tank.

Other important experiments which were carried out throughout the whole thirteen and a half months included the preliminary bacterial treatment of the sewage, with final purification on old pasture-land with a heavy clay subsoil. The most successful of these was an eight months' continuous test of treatment with a closed detritus tank, worked at the rate per day of six and three-quarters times its capacity, then through first-contact bacteria-beds (three fillings a day), with final purification by broad irrigation on the old pasture. An average of numerous analyses gave a purification effected of 86.76 per cent in albuminoid ammonia and 91.08 per cent in oxygen absorbed, the average strength of the crude sewage being 1.1823 grains per gallon of albuminoid ammonia and 7.4419 grains per gallon of oxygen absorbed. It will be seen that this process of detritus tank, first contact-beds, and broad irrigation effects a purification quite equal to closed detritus tanks with triple treatment in contact-beds.

For the last eleven years, the bulk of the sewage at Leicester has been efficiently purified by broad irrigation on a farm with a heavy clay subsoil; 1,350 acres have been specially laid out on a newly devised method, so that the effluent from the drains as well as from the surface can be intercepted and treated over and over again until a high standard is reached, and upon this work we expended about £60,000. Owing, however, to the great increase of the population, and the abolition of a subsidiary sewage-farm, it was found necessary to enlarge the system of treatment, and these experiments were carried out with the object of deciding (1) whether it would be better to increase the area of land laid out, (2) or adopt a system of preliminary clarification with subsequent final purification on the land without extension, (3) or even to adopt complete bacterial treatment to supersede the land.

The results of these experiments proved that the second-mentioned scheme — viz, bacterial clarification and land — gave an effluent at least equal to the best system of bacterial treatment on artificial lines, and the utilization of the land already laid out gives a greater certainty of permanent success than there has yet been time to establish in connection with complete bacterial treatment.

One very important fact in connection with this system is that the clarified effluent from the detritus tank and first contact-bed does not, when applied to broad irrigation, foul the grass land; in fact, in my opinion, it is an almost ideal process where plenty of land is available. I therefore designed a scheme to deal with our eight million gallons of sewage a day, comprising detritus tanks, with a capacity equal to one-sixth the daily dry-weather flow, 12 acres of first-contact bacteria-beds, the clarified effluent therefrom to be finally purified by broad irrigation, chiefly on old pasture and rye-grass land. This scheme, which included some additional pumping-plant and sewerage, estimated to cost about £170,000, has been adopted by the Corporation, and is now before the Local Government Board. I may add that, so satisfactory has been this combined bacterial and land treatment, the Corporation have, on my recommendation, purchased an additional 1,269 acres of this sewage-farm land which they previously held on a lease expiring in about fifteen years' time. — *The Builder.*

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

RHODE ISLAND NORMAL SCHOOL BUILDING, PROVIDENCE, R. I. MESSRS. MARTON & HALL, ARCHITECTS, PROVIDENCE, R. I.

DETAIL OF THE SAME AND VIEW OF THE RHODE ISLAND STATE-HOUSE.

ONE of the most amusing pieces of sarcasm we have noticed for some time was paraded a few weeks ago by the New York *Tribune*, in the Sunday edition of which a view very similar to this was published. The editor, seemingly puzzled, undertook to relieve a similar doubt on the part of his readers by adding to the title-line under the cut these words, "the Capitol is the building with the dome on the right."

STABLE BUILDING, COHASSET, MASS. MR. JULIUS A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

[Additional illustrations in the International Edition.]

DETAIL OF LAWN FRONT: HOUSE OF E. J. BERWIND, ESQ., NEWPORT, R. I. MR. HORACE TRUMBAUER, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF REV. DANIEL MERRIMAN, BAY STATE ROAD, BOSTON, MASS. MESSRS. LITTLE & BROWNE, ARCHITECTS, BOSTON, MASS.

THE GARDEN FRONT AND THE DINING-ROOM: HOUSE OF MR. MURRY NELSON, JR., WINNETKA, ILL. MESSRS. CHARLES A. PLATT AND W. A. OTIS, ASSOCIATED ARCHITECTS.

PLANS AND LIBRARY: HOUSE ON WOODLAWN AVE., CHICAGO, ILL. MR. W. A. OTIS, ARCHITECT; — IL TEMPIETTO: VILLA BORGHESE.

IN order to fill in the space we interpolate on this plate a view of the Il Tempietto in the garden of the Villa Borghese in Rome.

NOTES AND CLIPPINGS

A NEW FIRE-EXTINGUISHER. — George C. Hale, ex-Chief of the Kansas City Fire Department, has invented an automatic chemical fire-extinguisher which appears to work well. The invention is in the nature of an addition to or an improvement upon the regular chemical extinguishers, but, instead of the small tanks carried by firemen, a tank capable of holding 500 to 1,000 gallons is installed in the building to be protected. The tank is connected with an automatic alarm which sets the extinguisher in operation, and at the same time notifies the Fire Department. In a recent test a seven-gallon tank was used. This was set up in one corner of a yard. To the tank was attached a line of 1-inch pipe leading to another part of the yard. At the far end of the pipe a regular sprinkler-head was attached and on the ground immediately beneath it material for a good-sized bonfire was piled up. It is in the attachments inside the tank that the main idea is evolved. In the bottom of the tank was seven gallons of a solution of water and bicarbonate of soda. Near the top of the tank there was suspended an open-mouthed bottle containing sulphuric acid. The mouth of the bottle was covered by a circular cap pressed down by a piston descending from a valvular arrangement by which the tank was closed. This piston was connected with a spring, the action of which was to raise the cap off the bottle. This piston was depressed by air pumped into the lead pipe, and it held the bottle upright. When the fire was started and the heat caused an expansion that opened the distant sprinkler-head, the air was released from the pipe, the piston in the tank shot upward and released the bottle, which tilted over and precipitated the acid it contained into the solution of soda. This created a terrific pressure of carbonic-acid gas, which, with the soda-water, was projected with great force from the sprinkler-head. The fire, which had made considerable headway, was extinguished almost instantly. In a subsequent test the air was allowed to leak from the pipe until the pressure was only three pounds, but that proved sufficient to operate the sprinkler. To meet the contingency of premature action on the part of the extinguisher through a leakage of air, a gauge is attached, and Hale is getting up a device by which the indicator on the gauge, when the air is reduced to a certain number of pounds, will make an electrical contact and sound an alarm. In the same manner the release of the air through the opening of the sprinkler-head in case of fire will turn in a fire-alarm. In a closed room the carbonic-acid gas will extinguish a fire by smothering it, without much damage from water. — *N. Y. Evening Post.*

ELECTRIC-RAILWAY REGULATIONS. — The municipal authorities of Leipsic, Germany, appear to take the position that the grade-crossings of an electric street-railway service, when the cars maintain a speed higher than that which vehicles drawn by horses would ordinarily have, constitute a hazard comparable in a number of ways with the grade-crossings of steam-railway tracks; and in the past the street-railway company maintaining its service there has either had men with flags stationed at crossing roads to give warning of approaching cars, or the conductor on one of these cars, on coming to the crossing of a street, has been obliged to run ahead for the purpose of seeing that no vehicle was crossing, or was likely to cross, which would be in any way endangered by the passing of the electric-car. This system has either militated against the time made in running these cars, or has involved a very large outgo in paying the wages of flagmen. The company has

now introduced a system of light-signals at each crossing. Cars coming in one direction, when within a given number of feet of the street-crossing, cause the signal to glow with a red light, or, if coming in the other direction, the signal shows a green light, and this is said, by means of reflectors, to be effective both during the day and night. They are, doubtless, much more careful of human life in Europe than we are in this country, and yet when it is taken into account that our various suburban electric street-car services are frequently run at a speed equal to that of the ordinary railway-trains, and that the modern long-distance electric-car is a very heavy vehicle, it would seem as though this German method of giving warnings at street-crossings is one which might be wisely investigated by supervising authorities in this country, for the purpose of seeing whether its introduction here would not be both feasible and desirable. — *Boston Herald.*

Charlemagne's Burial-place. — The perennial controversy over the exhumation of Charlemagne has revived of late in Germany. It is one of the most desperate of its class. We are accustomed to read, as a simple matter of fact, that the Emperor Otho III resolved to test the value of tradition which asserted that Charlemagne sat in a chair of state beneath the altar of the Church of the Holy Virgin at Aix la Chapelle. In the year 1000 he carried out his purpose. A manuscript almost contemporary gives an account of the operation in the very words, as it professes, of Count Otho of Lourello, Captain of the Imperial Guard, who was present. They cut through an "alcove" by the altar, and found the great King, exactly as legend described him, upright on his throne, the crown upon his head, and the sceptre in his hand, a gold chain round his neck. A snow-white beard covered his chest, and the nails had grown through his gloves. So well had he been embalmed that only the tip of his nose was decayed, and Otho replaced this with gold, removed the crown, sword, and other valuables, also one of the teeth; draped the figure in white, and rebuilt the alcove. The story could not be more circumstantial, and it is told by an eye-witness, apparently. Further, the crown and sword are preserved to this day at Vienna, and no one has ever questioned their authenticity. There was a "talisman" also, which Otho bestowed upon the city; the city presented it 800 years afterwards to Napoleon, who gave it to the Earl of Holland. His representative restored it to Napoleon III, and it is now at the Louvre. Upon the whole, the evidence seems indisputable. But on the other hand we have the positive statement of Eginhard and Thegan, his friends and Ministers, that Charlemagne was buried on the day he died. They say nothing of embalment. It seems very improbable that the science of those days could have preserved the flesh of a man who died of dropsy; certainly it could not have done the work in a few hours. Had it not been for this picturesque story, no one would have questioned that Eginhard's description refers to a simple burial beneath the pavement of the church. But there is another objection. No "alcove" can be found which shows signs of disturbance, and, though the pavement has been tested again and again, no vault can be discovered. Further, the Chronicle of Cologne reports, under the date 1165, that Frederick Barbarossa "lifted the bones of Charlemagne out of the sarcophagus in which they had lain for 351 years." Apparently they had not heard at Cologne of Otho's remarkable discoveries. A sarcophagus is still shown to visitors, but, to complete the confusion, it is far too small to have held the giant. The crown and sword and the rest have still to be accounted for. But it is recorded that when the Danes were advancing on Aix in 880 the treasures of the church were removed to Stablo. It seems more than likely that any valuables in Charlemagne's grave would be sent away with them. — *London Standard.*

The Balzac Statue. — The statue of Balzac ordered by the Paris Society of Men of Letters will be unveiled in the Avenue de Friedland this month. Never was an attempt to honor the memory of a famous writer attended with more difficulties. The Society gave the commission some years ago to the sculptor De Vasselot, who, for some reason best known to himself, produced a sphinx, which was promptly rejected. Then Rodin undertook the work, and produced a Balzac which was likened by adverse critics to a porpoise in a bath-robe. After the flood of discussion which it aroused had subsided, Rodin sold it to a wealthy Englishman. Next Falguière, the noted sculptor, took the commission, and died, after which Dubois finished the work. Even after the statue was done, there was trouble concerning the site and the pedestal, which required more than a year to settle. — *Exchange.*

Russian Izbas. — A fireproof village is the latest plan to which the Russian administration has resorted in order to prevent conflagrations, which have retarded so much the development of Muscovite country lands. It is known that the "izbas," or huts, of the moujiks are built of wood and roofed with straw, so that a whole village is likely to be destroyed entirely if only one hut catches fire. This was the fate of the prosperous village of Bazina. The inhabitants asked the Government for permission to establish themselves in a neighboring locality. Authorization was granted, but on the condition that houses shall be built in a manner different from the traditional one; that is, they should be constructed of fireproof-material. A subsidy of 100 rubles was granted to each inhabitant, and the municipality furnished iron at cost price. The village was built according to those conditions, but the peasants do not like it; the majority of them regret the old "izbas" where their fathers were born and where there is always a chance of being burned alive. — *N. Y. Tribune.*

Cast of the Colleoni for the Boston Museum of Fine-Arts. — The Museum of Fine-Arts has just received, as a gift from Francis Bartlett, of this city, a full-size cast in plaster of the great equestrian statue of Bartolommeo Colleoni in Venice. Negotiations for the production of this copy have been in progress for a number of years. As the supports of the statue are no longer considered strong enough to warrant the taking of a mould directly from the original, the authorities of the Berlin Museum have generously permitted the reproduction of their cast, which is one of three that were made about fifty years ago, the only full-size copies known to exist at the present time. Unfortunately, the Museum has at present no place in which it can exhibit a work of this size and scale, so the new gift will have to be placed in storage to await the growth and completion of the new Museum Building. — *Boston Transcript.*

Burning of the Château d'Eu, near Rouen. — The virtual destruction on November 11 of the Château d'Eu, the seat of the Duke of Orleans, was caused by a fire in one of the chimneys, and owing to the great height of the building the pressure of water was insufficient to reach the flames. The greatest efforts were made to save the art-treasures in the building, but they were not entirely successful. Many objects of great value were destroyed, including two-thirds of the library of 30,000 volumes. Among the art-works which were rescued was a statue of Psyche, which was presented to the late Duke of Orleans on the occasion of his marriage, in 1837, by the city of Paris. A large bronze statue by Princess Marie of Orleans was also saved. — *Exchange.*

Rumored Aztec Find in Mexico. — A remarkable story of the discovery of hidden Aztec treasures has just been reported to the Government authorities at Tepic by the Rev. Pablo Martino, the parish-priest of Yesca. The priest makes a statement, which is concurred in by several reliable witnesses, that a party of Americans headed by an archæologist who gave the name of Heverick arrived at Yesca several weeks ago and went from that place into the mountains accompanied by three Mexican guides. The archæologist directed his course by means of a chart which he claimed to have copied from an Aztec stone tablet in the National Museum in the City of Mexico. He found a vast cavern in a mountain near Yesca. Immense stone images stood about this chamber and in one end was a handsome altar. In a chamber adjoining this main temple was found a great store of ornaments and utensils belonging to the Aztecs, or some other prehistoric race. Twelve burros were required to transport the articles taken from the cave to San Blas, where they were shipped to San Francisco, accompanied by the Americans. As such articles cannot be removed from Mexico without the consent of the Government, an investigation is in progress. — *N. Y. Evening Post.*

Test of a Twenty-story Stand-pipe. — Severe and successful tests were made by the fire-department of the 6-inch stand-pipe in the "Flat-iron" building, at Broadway and Twenty-third St., recently. Chief Croker declared that it had demonstrated that no matter how high a building might be it could be safely protected from fire if properly equipped with stand-pipes. He added that such a pipe as in the "Flat-iron" building erected by the side of the pier of the East River bridge would have saved that structure. The purpose of the test was to determine if the 6-inch pipe would stand the great pressure of twenty three stories of water and to find out how much force could be given to a stream from the hose attached to the stand-pipe at so great an altitude. In the second trial nine streams were thrown, one from each of the eight floors above the twelfth story and one from the roof. Three 4-inch nozzles were used, and a pressure of 200 pounds was obtained upon each of the nozzles. When the trial was finished Chief Croker said: "In every respect the test has been perfectly satisfactory. The stand-pipe in this building is made of galvanized-iron and stands the great pressure all right. Summarized, we have done here with two engines, I might say with one, what it would have taken a second alarm, or eight engines, to do without the aid of the stand-pipe." — *Boston Herald.*

The Seismograph and Bridge Vibration. — An engineer named Omori has become familiar with the apparatus used in detecting and registering earth-tremors through his service on the Imperial Earthquake Commission of Japan. He was thus led to consider the question of utilizing seismometers for another purpose. Some of the strains to which bridges are subjected, especially the ordinary bending from stationary loads, can be easily computed in advance. But another set, due to moving loads, are not so readily ascertained. These are vibrations, up and down, crosswise or endwise. They have more to do with the security or insecurity of a given structure than the bending strains. Mr. Omori has tried his seismometers on bridges long enough to prove that they are so delicate that they will afford valuable information. He advises making tests at regular intervals, as in this manner warning would be given when a bridge was weakening through age. — *N. Y. Tribune.*

Luini's Portraits of the Sforzas. — The municipal museum of Milan has acquired from Count di Cigada fourteen fresco portraits which Bernardino Luini painted on the walls of a house originally belonging to Leonardo da Vinci, but which passed into the possession of a favorite of Duke Ludovico Moro. In order to testify his gratitude this person employed Luini to paint portraits for fourteen members of the Sforza family. For a long time these pictures were attributed to Leonardo, until chronological comparisons proved the impossibility of this theory, and experts decided that they were by Luini, the pupil of Leonardi, whose frescos at Lugano and Milan are among the finest specimens of this art. The portraits mentioned have been carefully detached and cleaned. Particularly impressive is that of Maria Sforza, the defender of national independence, under whose rule art attained its golden age in Lombardy. — *Exchange.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, NOVEMBER 29, 1902 No. 1405

CONTENTS.

SUMMARY: —
Publicity in a Measure a Correction of Trade-union Tyranny.— The Anthracite Coal-strike Situation. — The Blackmailing of Architects by Trade-unions. — The late Prof. Ogden N. Rood's Service to Painters. — Death of Julius F. Munckwitz, Architect. — The Part of Aluminium Bronze in Aërial Navigation. — Recent Accidents to Navigable Balloons in Paris. . 65
THE HENNEBIQUE SYSTEM OF ARMORED-CONCRETE CONSTRUCTION. — I. 67
ROMAN AND ROMANESQUE FRANCE. — IV. 70
A SEARCH FOR THE TIBER'S TREASURES. 71
ILLUSTRATIONS: —
Apartment-hotel, Nos. 204–6 West 72d St., New York, N. Y. — Les Aliscamps; —View of the Amphitheatre, Arles, France: after an old Print. — Doorway to the Cloister of S. Trophîme, Arles, France. — Gates to the James Russell Lowell Memorial Park, Cambridge, Mass.
Additional: Entrance to "The Breakers," Newport, R. I. — Sarcophagi in the Musée Lapidaire, Arles, France. — Royal Academic High School for the Arts of Building and Music, Charlottenburg, Prussia. 72
NOTES AND CLIPPINGS. 72

TRADES-UNION matters are exciting, just now, a public attention which promises well for the future. In this country, publicity is the great purifier of politics, business and social relations generally, and the more frankly and thoroughly the interests of capital and labor are discussed, the sooner a healthy and intelligent public sentiment in regard to them will take the place of the atmosphere of lying, bullying and hypocrisy by which they have been so long obscured. The relations of the coal operators and their men, which are now under searching investigation, afford a lesson of which the public has begun to understand the importance, and it must be confessed that, so far, the operators have not gained much sympathy, and, for them, the loss of the credit which the public was once ready to concede to them is a misfortune, from the effects of which they will not soon recover. Their claim, that thousands of men were ready and anxious to work in the mines during the strike, but were prevented by fear of violence, does not seem to be substantiated. Undoubtedly, the disgraceful Pennsylvania statute, requiring miners to be licensed, kept away a great many men who would have been glad of the work; but the fact appears to be that, notwithstanding the assertions of the operators, a general feeling of dissatisfaction on the part of the miners with their wages, their treatment, and the conditions of their labor, had a great deal more to do with the strike than the operators would have us believe; and that Mr. Mitchell, instead of coercing, by his eloquence and intrigues, a hundred and forty-eight thousand prosperous and happy people into abandoning their work, did little more than put himself at the head of a movement which could not, in any case, have been long delayed.

THE singular unreasonableness of the operators in regard to the mere technicality of recognizing the Mine-Workers' Union does not add to the dignity of their position. That the Mine-Workers' Union exists is a fact beyond dispute, and to refuse to recognize facts is one of the surest indications of incapacity on the part of a business man. The operators say, we are told, that they cannot endure that men brought up in bituminous coal mines should claim to speak for anthracite workers; but if the anthracite workers choose bituminous miners to speak for them, it seems to the public not only tyrannical, but foolish, to refuse to listen to their chosen representatives. The operators say that a bituminous miner cannot possibly understand the conditions of the business of anthracite mining; but the anthracite miners would naturally instruct their representative in matters where such instruction was necessary, and the public cannot avoid the reflection that it has, for many years, been obliged to accept, as representatives of the anthracite operators, railroad presidents, who, to say the least, are not likely to know much more of anthracite mining than the bituminous workers. No one can deny that there is now, in this country, a strong tendency to consolidation, not merely of similar interests, but of those only indirectly allied. The anthracite mines are themselves mostly in the hands of railways; the great Steel Corporation makes rails, builds bridges and other structures, navigates ships, works mines, and carries on many other kinds of business; the Western packing-houses kill hogs and cattle, sell fresh beef, salt pork, sausages and beef extract, and make fancy soap, without public condemnation; yet these various industries are much more diverse than those of digging out anthracite and bituminous coal. That it may be inconvenient at times for the anthracite miners to depend, in conferences with their employers, upon men trained in another business, is quite probable, but that is a matter which, among reasonable men, would soon correct itself; and the operators, by struggling over a question purely nominal, not only discredit their intelligence as business men, to say nothing of their good faith in accepting the intervention of the President's Commission, but expose the public to great danger of the reopening of the conflict through what the miners would have reason to consider a violation of a solemn pledge.

AS usually happens, while the anthracite operators, as employers, are not exhibiting themselves to the public in a favorable light, the employed, in various parts of the country, also show signs of a disposition not yet quite regenerate. Fortunately, the antics of enthusiastic workingmen are much less to be feared than the obstinacy, unreasonableness, or cruelty of those who control great enterprises, or great masses of capital, and it is to be hoped that the display which has of late been made of the astounding tyranny and folly of certain unions may influence public opinion in such a way as to assist the respectable workingmen in taking the control of their affairs out of the hands of the reckless or corrupt schemers who now, in so many cases, manage the unions. It is quite as easy to teach workingmen as railroad presidents that all persons who use the power of combination to prevent other people from getting employment, or from procuring materials for their business, or to injure them in any way, are enemies of the community, and must be dealt with in the way that communities deal with their enemies.

IT is quite time that the reputable unions of mechanics engaged in the building trades should express themselves clearly and emphatically in regard to the blackmailing which is practised upon architects in their name. For several years men, sometimes in pairs and sometimes singly, have made the rounds of the architects' offices, at least in Boston, inviting subscriptions to what purports to be a book of some sort, to be issued under the auspices of a certain labor organization. Nearly all architects have a very friendly feeling for the skilled mechanics who help to transmute their designs into enduring materials, and, when the trick was first practised, many paid the two dollars asked for, or even more, supposing that they were contributing to the benevolent fund of a recognized union. A few weeks later, however, a second deputation presented itself, often in a condition suggesting alcoholic tonics, with another subscription-book. Those charitable architects who had already contributed to the first one were sternly told that this was a totally different affair, conducted by an organization which had nothing to do with the other, but which had it in its power to make a great deal of trouble for architects. Apparently, some of the younger members of the profession were frightened by these threats, for they have been made more openly year by year, until the blackmailers do not hesitate to tell architects who refuse to open their pocket-books that they are liable to have strikes declared against their buildings.

CONSIDERING the narrow income of most architects, and the friendly services which they are always willing to render, and do render, in multitudes of instances, to individual workmen with whom they are brought in contact, this system of compelling contributions by threats in the name of labor organizations is a pure and simple outrage. It is not likely that the working members of the unions know anything about the actions for which they are put forward as responsible; and it is not impossible that the collectors of contributions may be, at least in some cases, mere swindlers, masquerading under the guise of emissaries of labor associations; but it is significant that a motion made at a meeting of the Central Labor Union, in Boston, to investigate and suppress all attempts to collect money from architects by threats in its name, was quietly smothered, and there is reason to believe that some of the officials of the various unions and federations know more about

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

the matter than they would be willing to acknowledge. However this may be, there is no doubt that the practice is one which every right-minded workingman would repudiate at once, and those who carry it on are bringing the organizations which they profess to represent into contempt among the people who have more influence than any others in the community in securing for workingmen, or, at least, for those workingmen employed in the building trades, the consideration and respect which they themselves feel for men who practise faithfully and skilfully the various arts whose difficulties they are trained to appreciate. It will be a sad day for the building trades when architects and workmen come to regard each other with suspicion and distrust; and the sooner the Federations of Labor, the Knights of Labor, the Central Labor Unions and the other influential and respected organizations of building workmen publicly denounce and repudiate those who use their names for extorting money from architects, the better it will be for the continuance of the relations between those who design and those who execute which have been for so many years pleasant and profitable to both.

THE death of Professor Ogden N. Rood, of Columbia College, has called forth some interesting expressions of gratitude from artists. Professor Rood, as every one knows, while very eminent in all departments of physical science, devoted himself at one period, with conspicuous success, to the theory of color, and published a work on the subject which has long been an authority among scientific men. It is, however, remarkable that artists, who, as a rule, consider "an eye for color" to be a heaven-sent gift, and despise scientific discussion, should have found in Professor Rood's work suggestions which they were not only willing to use, but to be grateful for. Mr. Ruskin, as will be remembered, summed up the duty of students in such matters by saying to his pupils, "Whenever any scientific man tells you that any colors are inharmonious, make a note of those colors, and put them together whenever you possibly can"; and this attitude suits many artists, and many more amateurs; but so accomplished a master of color as Mr. John La Farge is not ashamed to say that Professor Rood's writings were "a consolation to me long ago, in my attempts at disentangling what was right in my instinctive apparitions"; and other painters, little less distinguished as colorists, speak in similar terms.

MR. JULIUS F. MUNCKWITZ, for many years Supervising Architect of the Central Park, in New York, died at his home in that city a few days ago. Mr. Munckwitz was born in Leipsic, seventy-three years ago, but had spent nearly all his life in New York. From the time of the first laying-out of the Central Park he interested himself in its development, and was employed, almost from the first, in various ways in connection with this and other parks, becoming Supervising Architect and Superintendent of Parks in 1871. In that capacity he designed many of the buildings erected in the Central Park. His son, who bears the same name, some years ago succeeded him as Architect of the Park Department.

SOME student of chemistry might do worse than to undertake, perhaps as thesis work, the study of the alloys of aluminium and magnesium. All these alloys are easily made; most of them are less susceptible than pure aluminium to the action of alkaline reagents, and they are lighter than pure aluminium; while some of them have been recently reported to have shown a tensile strength greater than that of steel. If this report should be confirmed, and a compound metal could really be obtained, stronger than steel, and weighing less than one-third as much, at a cost comparable with that of pure aluminium, many industries would be revolutionized, and, above all, the art of navigating the air would receive a development such as nothing else could give it. Until now, although aluminium is a cheap and familiar material, it has not been found practicable to use it in balloons, for the reason that a greater weight of it is required, for a given strength, than of steel. M. Santos-Dumont, who has distinguished himself by his minute study of every detail of aëronautics, employs steel piano wire to suspend the cars of his balloons from the inflated portion, and steel is used in other places where tensile strength is required, while the engines and motors, which form a very large part of the load to be lifted into the air, are also of iron and brass, or copper. If an equal bulk of a metal weighing one-third as much could be substituted for these, an immense increase in power could be obtained, and it is hardly too much to say that the future of the navigation of the air depends upon the discovery of such a metal. According to the chemists, an alloy of equal parts of aluminium and magnesium is extremely brittle, but compounds containing not more than fifteen per cent of either metal are malleable.

THE recent accidents in Paris have greatly diminished the confidence and interest with which the public had begun to regard the modern advance in the art of navigating the air. According to Colonel Espitallier, however, who writes in *Le Génie Civil* as an expert familiar with the circumstances of both cases, each of the accidents was due to neglect of simple and obvious precautions. In the first case, M. Severo d'Albuquerque, a Brazilian, like M. Santos-Dumont, but, apparently, less methodical and cautious, had constructed a balloon of a somewhat novel type, propelled by means of two gas-engines. The car was suspended close under the balloon, and the two gas motors were, in consequence, brought dangerously near the atmosphere of mixed hydrogen and air which always clings to the surface of a balloon. Five years ago, a balloon in Germany, similarly constructed, took fire and exploded in the air; and Colonel Espitallier says that M. Severo should have taken warning from its example; but, instead of this, he even removed the wire-gauze casings with which the maker of the gas-engines had been prudent enough to surround their torches, and, at the same time, fastened up one of the safety-valves of the balloon. The remaining safety-valve was at the rear of the balloon, near the propeller, and almost directly above the rear gas-engine. The hydrogen which would inevitably escape from the safety-valve as soon as the balloon was exposed to the rays of the sun, or rose far enough into the air to feel the diminution of atmospheric pressure, was, therefore, likely to be churned up by the rear propeller, surrounding the end of the balloon with a large volume of an explosive mixture, close to the torch of the gas-engine. At its first trial-flight, with its owner on board, the machine behaved as, perhaps, it might have been expected to do. While it was high in air, a flash was observed at the place of the rear gas motor, followed by a second, and brighter one, as the whole mass of hydrogen in the balloon blazed up, letting the car and its occupant fall to the ground.

THE second accident, which occurred in the middle of October last, was not due to such rash neglect of ordinary precautions, but might, according to Colonel Espitallier, have been avoided by greater care and experience. A German Baron, named Bradsky, had been for two years in Paris, engaged in the construction of a navigable balloon, of a new and meritorious type. Being long and narrow, the balloon was exposed to the pitching due to the movement in it of waves of gas; and, to prevent these, it was divided into sections by silk partitions. Baron Bradsky had arranged for a trial of his invention on the morning of October 13, on the plain of Issy, which would give space for its manœuvres. Unfortunately, his confidence in the balloon was so great that he resolved to sail out to Issy from Paris in it, accompanied by M. Morin, an engineer, and an experienced aëronaut. From the very first, the balloon steered badly, and the wind, which was tolerably fresh, drove it toward the hill of Montmartre. In order to clear the lofty buildings on the hill, the aëronauts threw out so much ballast that the balloon rose high into the air. This caused the gas to expand, and a considerable quantity escaped through the safety-valve. The aëronauts then allowed more gas to escape, in order to descend again, leaving the balloon, when they had approached the surface, only partly filled. When they were within some three hundred feet of the ground, M. Morin spoke to a bystander, M. Aubert, asking him if there was an open space near, where the balloon could be brought safely to the ground. M. Aubert pointed to the village of Gonesse. The wind would not carry them in this direction, and the two aëronauts turned the rudder sharply, and quickened the speed of the screw. The sharp twist given to the balloon by this manœuvre seems to have caused a wave in the half-empty balloon, which caused the gas to accumulate at the rear end, lifting it much higher than the front. The bands and wires connecting the car with the balloon were not properly designed to resist a strain of this sort, and the front wires, on which nearly all the weight was thrown, gave way. As the car dropped, through the parting of these wires, the shock broke the next wires, and so on until the car broke entirely away from the balloon, and fell, killing both its occupants, while the main body of the balloon rose into the air, and was blown far out into the country.

THE HENNEBIQUE SYSTEM OF ARMORED-CONCRETE CONSTRUCTION.[1] — I.

IRON and steel have been used in the construction of railroads, steamships, bridges, office-buildings of stupendous heights, factories, exhibition-palaces, markets, theatres, apartment-houses, grain-elevators, water-towers, stand-pipes, smoke-stacks, and water-mains of hundreds of miles in length. Even churches have been built entirely of iron. It is due to the triumph of iron and steel engineering in the latter half of the past century that our profession is recognized to-day as one of the most honored of human vocations.

I ask, is steel really the most suitable material for all these purposes? Is the engineer (who is defined as a person employing the resources of nature with the least amount of human labor to the benefit of mankind) right in using steel only as the skeleton of his constructions? The universal reign of steel is irrevocably past, and we are returning with rapid strides to the old, time-honored masonry construction.

Not to brick or stone work, but to an artificial stone, *i. e.*, concrete, strengthened by steel. This composite material is variously called concrete-steel, ferro-concrete, or armored concrete. Concrete itself is not a new building material. Vitruvius Pollio, the famous writer on architecture and engineering, who lived in the beginning of our era, describes it as one of the most valuable building-materials,

Fig. 3.

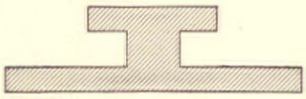


Fig. 4.

and as one which, centuries before his time, had been used for foundations, for walls and in all structures where great strength was required. The great dome of the Pantheon, in Rome, 142 feet in diameter, was built entirely of concrete, and it stands to-day, having braved the destructive influences of nature for nearly two thousand years. In the House of the Vestals, an upper floor of 20 feet span was a simple slab of concrete 14 inches thick. Even in Mexico there are buildings, the remains of an unknown civilization, which have concrete foundations, and in the Italian colonies of Magna Græcia, there is evidence that the ancient Greeks knew what concrete was and how to apply it. The walls of Reading Abbey, in England, were apparently faced with square blocks of stone on both sides, and the core and backing were made of concrete, with the result that, although the stone appears to have perished, the concrete, which was intended to play a secondary part, still remains.

At Badajos, in Spain, the walls of the castle and fortifications still show the marks of the boards used for the moulds. In all parts of the world there is evidence that concrete, as a building-material, was well known and largely used many hundred years since, long before the general introduction of steel and other artificial substances, now recognized as legitimate materials of construction. As Portland-cement was unknown eighty years ago, all the concretes named had lime for their cementitious constituent; but the excellent quality of the lime, and the apparent care and knowledge applied in the selection of the component parts, resulted in the construction of buildings superior in strength and durability to any of modern erection, sky-scrapers not excepted.

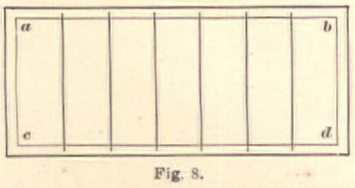


Fig. 8.

The use of concrete alone, however, is confined to that limited number of cases where economy in time and labor does not enter into consideration. This is because concrete has a comparatively high compressive strength, but a very low tenacity, thus forming, like cast-iron, a very uneconomical material of construction. To illustrate this point further, let us consider a concrete beam, *A B* (Fig. 1), of rectangular section, supported at the ends and loaded. The beam will deflect, the upper fibres will be in compression, the lower fibres in tension. The greatest stresses occur in the extreme fibres at top and bottom and are of the same magnitude. The nearer we come to the centre of the beam, called the neutral axis, the less will be the stresses. Their distribution in any section of the beam is graphically represented by the diagram *a a′ n b b′*. The greater the load the greater will be the extreme fibre stresses, and, in increasing the load, we reach a point where the ultimate tensile strength is reached and the beam fails. It fails because the lower part of it, which is in tension, is destroyed, while the upper part is strained to only from one-tenth to one-twentieth of its ultimate strength, concrete having a tenacity of about 200 to 250 pounds per square inch and a compressive strength of 2,000 to 3,000 pounds per square inch after two months, which might increase to 5,000 pounds after two years. This unfortunate property of concrete can easily be remedied by embedding steel rods where tensile stresses might occur. This expedient, however, is not new. Monier, a Frenchman, as early as 1876, took out his first patent on concrete-steel construction, and thousands of water-tanks, sewers and water-mains were built of concrete armored with wire nets, and a new field and new possibilities were opened, which will soon revolutionize our building-practice.

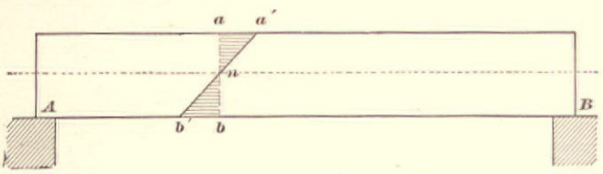


Fig. 1.

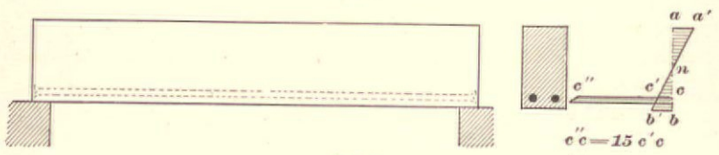


Fig. 2.

All rational combinations of concrete and steel are based on the following facts: —

First. — The coefficients of expansion of concrete and of steel are practically equal, as many scientists of Europe and America have demonstrated.

Second. — A perfect bond exists between concrete and steel. Their adherence has been determined by different authorities, and found to be 570 to 650 pounds per square inch.[2]

Third. — The concrete fully protects the iron against corrosion.[3] We know, besides, that iron nails were preserved by the mortar of Roman walls for 2,000 years, and in view of this fact can we doubt the preservative efficiency of our first-class Portland-cements?

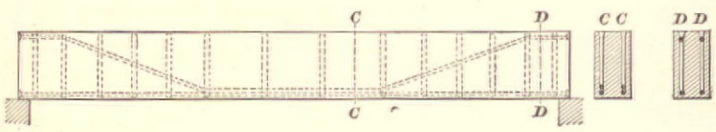


Fig. 5.

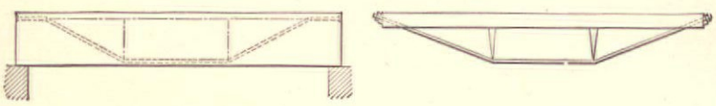


Fig. 6.

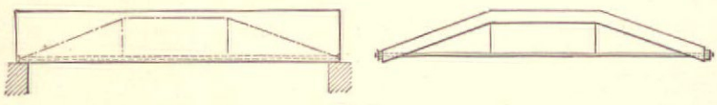


Fig. 7.

Fourth. — The ratio of the moduli of elasticity of concrete and steel is as 1 : 15. In other words, if two fibres of concrete and of steel, respectively, of the same length, be subjected to equal elongations, their stresses will be in the ratio of 1 : 15.

Let us now revert to our concrete beam, embed steel rods in the lower part and apply our loads. The beam will again deflect, the upper fibres will be in compression and the lower fibres in

[1] A paper by Mr. Leopold Mensch, C. E., read at a meeting of the Civil Engineers' Club of Cleveland, and printed in the *Journal* of the Association of Engineering Societies.

[2] It may be interesting to know what the length of an iron rod, embedded in concrete, must be in order that it may fail by tension before rupturing the bond. If we assume the ultimate tensile strength of iron to be 57,000 pounds per square inch, we have the force required for breaking the rod bodily $= 57{,}000 \frac{\pi d^2}{4}$; for breaking the bond the force required $= l\, d\, \pi \times 570$; $l\, d\, \pi$ being $=$ area of surface in contact. Equating these two expressions, we get, as minimum length, $l = 25\, d$. Thus, if a bar of round iron has a length of more than twenty-five times its diameter, it will break before it can separate from the concrete.

[3] An experience of 2,500 years has proved that concrete is absolutely indestructible, that it resists the disintegrating effects of air, moisture, water and steam, even of sea-water and of sulphuric and chlorine gases; and that, if the metal embedded in concrete were not thus protected by the latter, concrete-steel structures would be impracticable. Happily, however, wherever such work has been taken up after years of exposure, the steel has been found free from any trace of oxidation. To remove any possible doubt, Mr. Hennebique resolved to urge upon the city authorities of Grenoble, France, an official investigation into the preservation of steel in concrete. In that city a water-main, constructed on the Monier system, of 12 inches internal diameter and 1⅜ inches thickness, laid in 1886, had borne, for fifteen years, a head of 75 feet of water. The sections of the pipe were 6 feet 3 inches long, and the iron skeleton was formed by thirty longitudinal rods, ¼ inch in diameter, one interior spiral of 5-32-inch wire and one exterior spiral of ¼-inch wire.

On February 2, 1901, 16 feet of this conduit were taken up. The tubes were found in a perfect state of preservation; the steel did not show the slightest trace of oxidation; the adhesion of the steel to the concrete, despite the slight thickness of the pipes, was such that it could be separated only by heavy blows from a sledge-hammer.

tension; but the diagram of stresses, which in Figure 1 was represented by $a\,a'\,n\,b\,b'$, is now distorted by the new stresses which are produced in the steel rods, forming the diagram $a\,a'\,n\,b\,b'\,c'\,c''$ (Fig. 2). We have learned that a perfect bond exists between the steel and concrete, therefore it is evident that the extension of each steel fibre is the same as that of the adjacent concrete fibre. But, by the fact stated above, this involves stresses in the steel fibres fifteen times as great as in the adjacent concrete fibres, since these are necessarily at the same distance from the neutral axis. This has the same effect on the moment-of-resistance of the beam as if we had added to the lower part of the section an area of concrete having fifteen times the area of cross-section of the steel rods (Fig. 3). This will at once be recognized as the section which, in rational design, is given to cast-iron girders; but the great difference is that, in our case, we get a very considerable increase in strength of section with only a very small increase in weight. The more steel we embed, the less will be the tensile stresses in the concrete itself and the greater will be the part of the tensile stresses taken by the steel. In fact, in all rational designs the resistance of the concrete to tension is entirely disregarded.

Fig. 9.

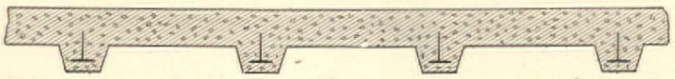


Fig. 10.

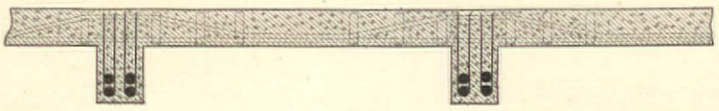


Fig. 11.

But we have to guard against an excess of steel. If the ideal T-section becomes excessively wide at the base, the relatively small compression-flange, formed by the concrete, has to take too large a compressive stress, and might fail by crushing. We thus see that, in a given section, there can be but one proper proportion of steel to concrete. In building-practice there are many cases where the depth of the beam is limited, and where a very high capacity is required. In such cases we can further strengthen the beam by embedding steel rods in the upper part of the section, as well as in the lower part. This gives an ideal T-section, as shown in Figure 4. It is clear that we require a less area of steel in the upper than in the lower part, and we must maintain the proper ratio between the moments-of-resistance of the top and bottom flanges. Otherwise waste of material or failure of the beam will follow.

As in any steel and wooden beam, we have also to take care of the shearing stresses. The first engineer who grasped the importance of this consideration in connection with the strength of concrete beams was M. François Hennebique, and his scientific designs have made him the most successful concrete-steel builder in Europe.

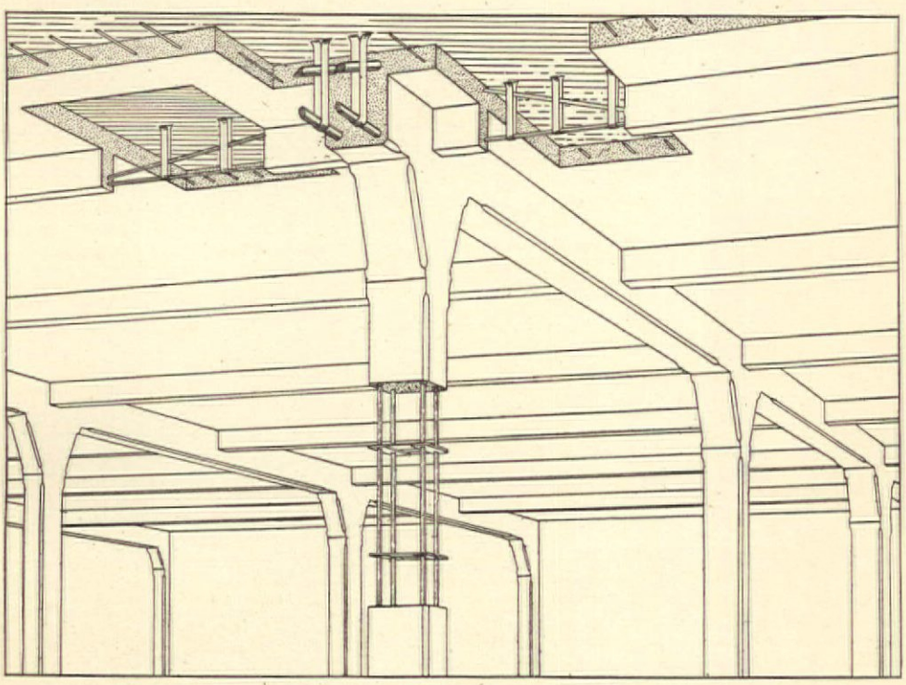


Fig. 12.

The girder (Fig. 5) which he has patented in all civilized countries of the world can hardly be improved. Its principle consists in embedding pairs of rods, in vertical planes, in the beam, one being always straight, the other bent upward near the supports, both being united by a number of bent straps, or stirrups.

The concrete, in connection with the steel rods, may be regarded as forming queen-post trusses, as shown separately in Figures 6 and 7; the place of the wood being taken by the concrete, and that of the verticals by the stirrups. These stirrups take up also the horizontal shearing-stresses, which are greatest at the ends near the neutral axis, and for this reason they are placed close together near the supports (Fig. 5).

Numerous tests, made by M. Hennebique, with girders with and without stirrups, showed the great gain in strength which results from their use.

It might be objected that we rely on the bond of the steel with the concrete; and that yet, in the most vital part of the beam, namely, in the centre, the concrete of the bottom flange will first fail when the beam is overloaded, and destroy the bond. This will surely happen; pieces of concrete may even drop out and lay the rods bare; but that is also where the real truss action of this combination commences, in which case we need the bond in the centre no longer; the steel rods will be strained in a much higher degree than before, the beam will very appreciably deflect, and at last failure of the beam will follow, either through breaking of the rods, through crushing of the concrete, or through simultaneous failure of both. But the dropping out of pieces of concrete long before half of the ultimate capacity of the beam is reached gives a timely warning, such as occurs neither with steel nor with wooden beams.

The theory of concrete-metal construction is at least as well known as that of steel beams; in fact, the successful builder in concrete-steel will guarantee his work with greater confidence than can the structural-steel works.

But economy and safety are attained only through scientific design, and the greatest calamities would follow if such structures were designed and built by so-called practical men.

One of the earliest applications of concrete-metal was in the construction of fireproof floors. Let us assume that we have to cover an area, $a\,b\,c\,d$ (Fig. 8), by a fireproof floor. In simple concrete floors we use steel beams, spaced 4 feet apart, and the whole is filled with concrete, as shown in section in Figure 9. It was soon found that these floors could carry a slightly greater load than that indicated for the beams alone, and that a more economical floor could be constructed by using T-sections instead of I-beams and placing them lower (Fig. 10). A similar floor was used in the building of the Citizens Savings and Loan Association in this city, only that T-sections of special shapes were employed. But M. Hennebique went farther. He substituted rods (Fig. 11) for the T's, a shape which is very easily procured in the market, and, especially to-day, at nearly half the cost of the T's. The girders, corresponding to

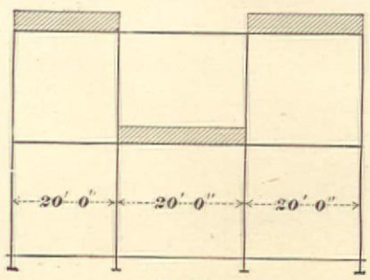


Fig. 13.

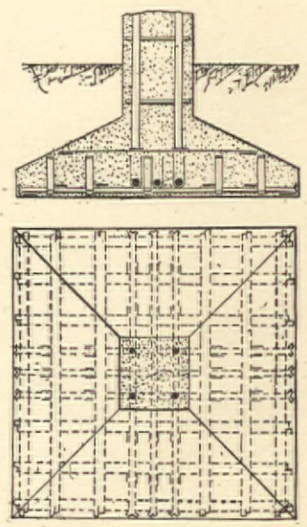


Fig. 14.

the steel beams in Figure 9, are substantially the same as shown in Figure 5. The slabs, between the girders, form a continuous beam, therefore tensile stresses are set up also above the girders. These are taken care of by horizontal rods at the bottoms of the slabs, and by bent rods approaching the top fibres over the supports. The whole floor forms the compression-flange of this composite girder, while the rods form the tension-flange; and the result is that we get a moment-of-inertia eighty to one hundred times greater than that of ordinary steel beams; and, as the ratio of the moduli of elasticity is only 1:15, we see that the Hennebique floors must be at least six times stiffer than steel girder floors.

In this connection I may cite a very interesting experiment made by the Engineering Department of the Orléans Railroad at the Austerlitz Station in Paris. A Hennebique floor, figured to carry a machinery load of 280 pounds per square foot, of a span of about 16 feet, was subjected, for a length of 17 feet, to a load of 420 pounds per square foot. The maximum deflection was $\frac{1}{8}$ inch, without any permanent set. In order to compare the resistance of this floor to shocks with that of steel-girder floors, this floor and a floor of the Quai d'Orsay station, built for the same purpose and of the same span, but consisting of I-beams and brick arches, were subjected to the blows of falling weights. The dead weight of the Hennebique floor was 60 pounds per square foot, that of the other 96 pounds per square foot. A weight of 110 pounds, falling from a height of $6\frac{1}{2}$ feet, produced, in the steel-and-brick floor, vibrations of an amplitude of $\frac{5}{32}$ inch, lasting two seconds, while a weight 220 pounds, falling from a height of 13 feet on the Hennebique floor, caused a maximum vibration of only $\frac{1}{32}$ of an inch, lasting $\frac{5}{7}$ of a second. Thus, twice the weight falling from twice the height caused only one-fifth of the deflection, with vibrations lasting only a third of the time.

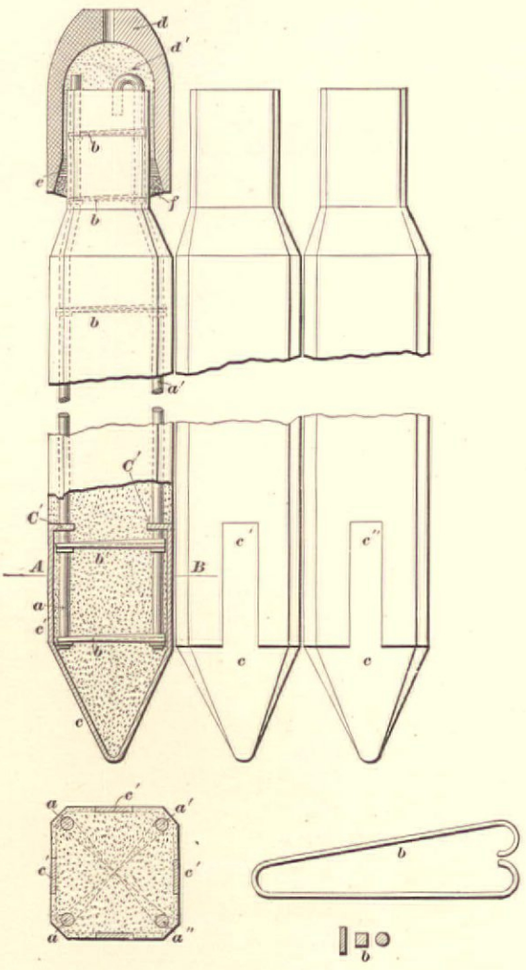


Fig. 15.

This is of enormous advantage in bridges, and especially in factory-buildings, not only because the lives of such structures are threatened by vibration, but also because freedom from vibration preserves the tools and makes better work possible.

The high price of steel, the long delays in deliveries of steel structural work, the difficulty (and often the impossibility) of securing economical sections, suggest the use of concrete-steel in the construction of wholly fireproof buildings.

Whether office-buildings, apartment-houses, residences or factories are to be built by the Hennebique system, the skeleton principle of construction is strictly followed.

If concrete walls are used they are strengthened by rods, and rarely exceed 6 inches in thickness. The columns consist of four or more rods, connected at short intervals by flat bars, and the whole is embedded in concrete. The rods (Fig. 12) are placed in the periphery only, thus giving the maximum radius of gyration and being in position to take any tensile stresses. The connections between the columns and the girders and beams are effected by ample brackets and are monolithic; and, as the floors are six times stiffer than steel-girder floors, the stresses, due to eccentric loading, are about one-sixth as great.[1] The columns can be so designed as to suit any exigency. Recesses can be formed for gas and water pipes and electric-wiring; brackets can be provided for transmission-shafts, electric travelling-cranes, etc. The diameters of these columns are only from 1 to 2 inches greater than those of steel columns without fireproofing; but for theatres and other architectural purposes they allow of a considerable reduction in width.

Hennebique columns were subjected to a severe test by the authorities of the last Paris Exhibition. The Palais de Costume was entirely built on the Hennebique system. The columns were 20 feet apart, and of such small diameter that the engineers doubted their resistance to eccentric loading, and applied a load of sand weighing 150 tons, or one and a half times the load for which the columns were calculated, in alternate panels of two stories (Fig. 13). The deflection of the columns could hardly be measured, and was a minute fraction of $\frac{1}{32}$ of an inch.

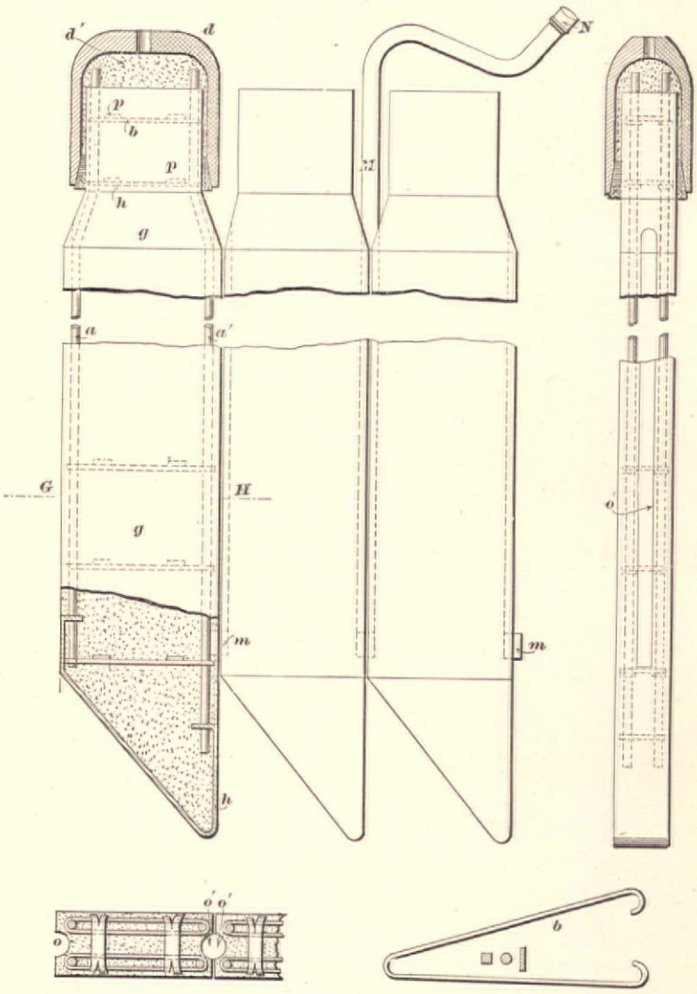


Fig 16.

A notable economy is obtained in the use of armored concrete for foundations. The ordinary methods heretofore in use can be described by saying that enormous masses of either concrete or steel beams were buried in the ground, making expensive excavations necessary, and cutting into the hard crust which generally overlies the yielding stratum. Hennebique's column-footings consist of a layer of concrete a few inches thick, in which are embedded steel rods in the two main directions (Fig. 14), and a monolithic truncated pyramid connected with the column they support. Such a footing may be considered a girder affected by uniformly distributed loads in an upward direction, and a nearly concentrated load acting downward in the centre. These forces tend to bend the pyramid in the two main directions, and this tendency is effectually resisted by the concrete in compression and by the rods in tension. The largest of these footings thus far constructed has a side of about 70 feet.

Where pile-driving is necessary concrete-steel piles are driven into the ground, and the columns are directly connected with them.

[1] See Handbook written by the author for Homan & Rodgers, London.

These piles are formed in moulds, and the concrete is strengthened by steel rods of suitable dimensions, connected at short intervals by stirrups (Fig. 15). At its lower end the pile is armed with a pointed shoe with side-plates, the ends of which are turned in, so as to lock the pile securely in place. The head of the pile is of less width than the body, allowing a clearance between the heads of two adjacent piles. In order to ensure uniform blows from the ram in the process of driving, and to prevent injury to the pile, the head is protected by a cap of cast steel and closed at its lower end by a clay ring held by a plug of hemp or spun yarn. The cap is previously filled with dried sand. A very regular cushion is thus formed on and all around the head, which cushion distributes the pressure in an absolutely uniform manner. This arrangement renders it permissible for the iron rods to project beyond the head of the pile, so that, in case of need, they may be connected with other parts of the structure or bent into hooks for convenience of handling.

The sheet-piles (Fig. 16) are strengthened by four rods, connected by wire clamps, which, in their turn, are cross-tied by flat-irons. At the lower end we have again a shoe, and the head is again of less width than the body, allowing room for the insertion of a cap. About 6 inches above the shoe on the longer of the narrow sides a projection, *m*, is formed, while the remainder of both narrow sides is grooved for the entire length. The projection on one of the piles slips into the groove of the next pile in ramming.

A special arrangement is provided to ensure the desired direction of driving. An iron pipe which fits the groove of the sheet-pile last driven, and that of the pile which is being driven, connects, by means of a hose, with a pump or water tank. This pipe serves also as guide, and the water forces out the sand which might jam the grooves, thus facilitating the driving of the pile. Once the pile is down to the desired depth, the pipe is withdrawn, cement is run between the grooves and a perfect water-tight joint and wall are established. Tongue-and-groove joints are also sometimes used.

These piles are somewhat more expensive than wooden ones, but are practically indestructible and of enormous resistance to bending. They are affected neither by the rise and fall of ground-water nor by sea-water, nor can they be attacked by teredos, which, in certain parts of the globe, destroy wooden piles in a very short time. What an ideal member in the construction of sea-walls, breakwaters, recreation piers, etc!

[To be continued.]

ROMAN AND ROMANESQUE FRANCE.[1] — IV.

ARLES.[2]

PLUTARCH, who gives a detailed account of the campaign of Marius in Gaul, 104–102 B. C., does not mention Arles; but in the "*Commentaries*" of Cæsar, and by other writers it is called a Roman colony of the Sixth Legion of Veterans; and it is probable that it was, after Narbonne, the most important place in that part of Gaul. Cæsar, during the siege of Marseilles, speaks of twelve vessels being built there (*naves longæ*) and armed ready for war in thirty days, so it must have been an important place with all the resources of a great city and shipyard. Honorius also, in a letter to Agricola, Prefect of Gaul, writes enthusiastically of the city, and of the crowds of merchants trading there; it was "the market of the world." In fact, "all the riches of the East, of fertile Africa, Arabia, Assyria, beautiful Spain and prolific Gaul . . . all send their produce . . . by sea and by land, in boats, in ships and in wagons." So, too, it was beloved of Constantine, and there his eldest son was born. It was from Arles that the Emperor started for his campaign against Maxentius, and it was during this journey to Rome that occurred the apparition of the luminous cross with the well-known legend: *In hoc signo vinces*. Moreover, the medals struck to commemorate the miracle, a hand holding a cross issuing from the clouds, had for the reverse the legend: *Aretas civitas*. After his victory over Maxentius, Constantine was baptized by Pope Sylvester, and, returning to Arles, he opened the celebrated Council in 314. It would be interesting to know where the Council was held, but history is silent upon the point. The Emperor embellished the city by erecting an Egyptian obelisk, and by decorating his palace with splendid colonnades and statues. He also constructed an aqueduct to supply the people with pure water from the mountains, and made Arles the political equal of Rome and Constantinople by establishing there the seat of the Governor of Gaul.

After the division of the Empire under Charlemagne, his son Charles became King of Arles and Provence. Charles le Chauve turned the city into a kingdom with a sovereign of its own, including Provence, Dauphiné, Orange, Bourgogne, Franche-Comté, Piémont, and Savoie as far as Genève. For 250 years it was governed by eleven kings succeeding Bozon, and then by consuls. Troubles succeeded; during which, in the eleventh century, the great church of S. Trophîme and its famous cloisters were commenced.

It is probably from this variety of ancestry, Greek, Roman, Gallic and, later on, Saracen, that the women of Arles have received their peculiar type of beauty — for there is no doubt that "*la belle Arlésienne*" is not a mere figure of speech. Their features are somewhat of the ancient Greek type — delicate straight noses, black velvety eyes, with faces of oval form. Their hair is generally dark brown, their complexions clear and pale. Some have olive complexions like the Italians — descendants, doubtless, of their Eastern ancestors. Others of Gallic origin are fair, with blue eyes and light hair. But the mass are dark-eyed with pale faces and beautifully chiselled features, holding themselves as if all the world belonged to them; grand creatures picturesquely clad, generally in black, with a *fichu* of lace over the shoulders gathered in at the waist; open necks with necklaces, and the quaint little *coiffure* on the top of a twist of hair. Such is the *belle Arlésienne* whom Bizet has immortalized; one can almost hear his music as they trip down the streets in the sunshine; and even when the icy mistral scuds round the corners like a whirlwind, they go on their way, nothing daunted, impervious alike to cold and its consequences, in spite of their uncovered necks.

Although the plain upon which the city is built is full of canals, rivers and dykes, it was far more so during the Roman period. The Rhone and the Durance spread their waters all over the country, and what are now shallow inland lagoons or marshes were then deep and navigable seas with innumerable islands. Montmajour and Les Baux, which are now hills rising from the plains, were then islands of a little archipelago; and Arles itself was connected with the sea by a series of navigable lagoons or canals.

The Amphitheatre suffered much from civic troubles. In the eighth century three square towers were erected for defensive purposes either by the Saracen Wali, of Narbonne, who obtained possession of Arles, or by Charles Martel, who expelled the Saracens in 739, the Amphitheatre itself being turned into a fortress, from which it degenerated into a small city of squalid hovels which remained until recent times. In an old print, the number of houses that were built into the colonnades may be seen, as well as several chapels; behind, to the left, is the tower of the cathedral, S. Trophîme.

Arles is full of fine portals and niches at the street-corners supporting figures of saints; and considering that the Roman theatre, the Cathedral, the cloisters and the Museum all deserve the most careful study, it is somewhat amusing to read in one's guide-book that the city "may be visited in a few hours." Why, one could spend a few hours in the Museum only, filled as it is with bas-reliefs, capitals, sarcophagi, and innumerable fragments telling of Roman splendor in the old days.

An interesting, though not a very beautiful, object is the water-pipe stamped with the name of the Roman plumber — *C. Canthius Porthinus fac.*, which was discovered in the bed of the river. Many of the sarcophagi, both Pagan and Early Christian, have been brought from the Aliscamps, the ancient cemetery (*Elisii Campi*), where the empty and uncovered tombs are witnesses of pillage and desecration. A few of them are sculptured on the sides with Early Christian or Roman designs, but the mass of those bearing any artistic value have been carried off by public authorities or private individuals.

One very interesting slab in the Museum deserves some description. It is called the *Miracles*. It is divided into seven compartments by stems of trees and foliage, and where the stems divide and form a sort of arch, a bird is placed. In the central division is the "Blessed Virgin," the clumsiest of all the figures. On the right we see "The Turning of the Water into Wine," "Restoring the Blind Man's Sight," and "Curing the Lame Man." On the left: "The Miracle of the Loaves and Fishes," "Healing the Sick Woman," "Raising the Dead." In each division Our Lord is depicted as the same short-haired youth, unbearded, which is uncommon, if not unique. The costumes are Roman; also the type of features and short hair of the Apostles; two or three of the heads recall the busts of Marcus Aurelius and Pliny. The persons upon whom the miracles are performed are of diminutive size.

Of the other sarcophagus, "The Miracle of the Loaves and Fishes," it will be noted that the faces are of the same type, and that the two Apostles holding respectively the basket of bread and the dish of fish are clean shaven, as represented on the first slab. The head of Christ is of a nobler type, with long curly hair, but still clean shaven, and recalling the type we associate with the young Siegfried, Gothic or Gallic.

"The Tomb of Phædra and Hyppolitus" is of finer workmanship, probably by a Greek sculptor, not of the best period. The drapery and some of the heads are fine, but the proportions of many of the limbs are incorrect. Above this is the noble fragment of a draped figure found on the Camargue, and a headless and armless "Victory" of beautiful form.

The entrance to the cloisters of S. Trophîme is an elegant pointed arch with graceful little columns of thirteenth-century workmanship. The cloisters are most ornate, and beautiful in the extreme, and are illustrative of architectural details of the twelfth to the fifteenth centuries. The older half is very rich in sculpture; on the outer face may be seen a bold specimen of dog-tooth ornament. Some of the capitals have a strong tendency towards Classical foliage. The first oratory at Arles was dedicated to S. Stephen, hence, his statue is placed by the side of that of S. Trophîme, the first Bishop in an important position. The west front of the Cathedral is a very fine example of Romanesque work, and owes its exquisite state of preservation to the hard material (marble) of which it is built.

It is characteristic of the compatriots of our old friend Tartarin that every one of whom one buys photographs has "les plus belles photographies d'Arles." You assure the man in the Museum that you have seen as fine elsewhere, that you have even bought some at two or three of the various stationers. "Ah, now," he retorts, with

[1] Continued from No. 1398, page 15.

[2] In this series of papers, I have purposely tried to steer clear of repeating what has already appeared in the *American Architect* upon the subject; consequently, much that is noteworthy in all the towns of Provence has been omitted. This applies also to the illustrations.

a patronizing air, "you mistake." (Madame and Monsieur are apparently superfluities in this part of France.) "Mine is the only complete collection." Then, you go round the corner to Mademoiselle ———, and she impresses upon you with her grandest manner that hers are unrivalled. "Assuredly it would be impossible to find the like in all the city." Nor are you contradicted in the most m· assured and polite terms; the whole air of the Arlesien is: "It is a privilege to buy of me; but if you would rather not, pray do not trouble about it." Some of them have courteous manners, but their characteristic style is roughness; indeed, my only and unique experience of rudeness in France, north and south, was at Arles, where I inadvertently walked into a church, to find a workshop and its owner, who reproved me, to put it mildly, in most unmannerly language for not perceiving the board: *Defence d'entrer*. Churches usually are for the use of the public; but S. Césaire is a workshop and coach-house for hearses. Many are the desecrated churches in the dead cities of Southern France. S. BEALE.

A SEARCH FOR THE TIBER'S TREASURES.

PROF. CIRO NISPI-LANDI, the author of the latest scheme for exploring the bed of the river Tiber, is no mere "dreamer." A man of profound learning, he now holds the responsible position of inspector of the national monuments to the Italian Government, and is the author of several thoughtful works on ancient Rome. It was the Professor's historical studies and researches that inspired him with his great idea of searching the Tiber for treasures. They directed his attention first to the length of time during which Romans, rich and poor alike, cast into the slow-flowing river their most cherished possessions, and also to the period, unexampled in history, of thirty-four centuries in which the Tiber was the centre of momentous events. Professor Nispi-Landi's notions were strengthened by what he saw while in charge, several years ago, of the work of building the Tiber's embankment. The Professor noticed, as he tells me, that "whenever and wherever the Tiber was searched in the course of bridge-building or of the work on the embankment, ancient and valuable things always came to light." Generally they were valuable enough to pay the entire cost of the operations. For instance, one Italian bridge-building firm, in laying the two pillars of the Ponte Palatino, discovered antiquities to the value of several million lire. In adjusting the foundation-pillar of the Ponte Garibaldi three beautiful antique bronze statues, one of Bacchus and one of Venus, came to light, and in widening the Ponte Cestio antique jewelry, one piece of which was a wonderful gold collar of turquoise, and other valuable relics were drawn up from the depths where they had lain for years. In the course of the complete work on the embankment enough ancient works of art and other relics were discovered to stock one of the richest museums in Rome, that of the Baths of Diocletian.

"Most of the treasures," remarked the Professor, in response to one of my questions, "are certainly to be found in the most central part of the river, and have remained undiscovered for that very reason." He consented to give a hint of his plans. He has, for this purpose, divided the Tiber into "zones," or districts. They are eleven in number, No. 1 covering most of the Tiber in Rome proper, the others the course of the river outside the Eternal City. "We shall proceed," said the Professor, "by digging parallel trenches for the first zone, where the ancient source of the river is dried up, with the aid of steam-pumps, and where the Tiberine waters follow their natural course with pneumatic tanks modified and adapted to the special use of river exploration." The enterprise will be financed by Chevalier William Millar, a wealthy Anglo-Italian of Leghorn, who has implicit confidence in the savant's scheme. Just when the actual work will be begun is not yet decided. The permission of the State was given to the enterprise some time ago, but recently some "recommendations" have been made by the museum of antiquities. Compliance with them has delayed matters, and it may be some time before the delving begins in earnest.

Search in the Tiber always has been richly rewarded. The Professor goes back as far as the thirteenth century, quoting one of its historians, Falminio Vacca, who described how, a small boat having sunk near the Ponte Sublicio and several swimmers being engaged to fish it out, arrows, swords, breastplates, arms of every description, "and other beautiful objects" recognized as purely Etruscan, were discovered and brought to the surface. But, after all, it is necessary only to review one's Roman history a little to convince any one that there should be riches in the Tiber. That they were put in is certain, and Professor Nispi-Landi states that in all his research he has been unable to find any record of any large quantities of them having been taken out. The records of sacrifices to the Tibertine deity go back to the beginnings of Roman history. Even Virgil tells how Æneas promised Father Tiber that if he would protect him from peril, "Thou shalt ever be worshipped by me with homage and with gifts." The example of Æneas was followed by the generations that came after him. Sacrifices were made on the eve of great events, such as battles, during times of national peril, to make sure of having the god on the suppliant's side, during great rejoicings, and to commemorate illustrious men who had died. These were the great public sacrifices, of course, but private individuals in prosperity and grief offered personally similar sacrifices, generally the most precious things they owned. Back in the time of the Arcadians, men used to be hurled into the Tiber, but soon they were replaced by puppets and graven images, and after this the offerings of money, jewelry and precious things began.

It was not only the Romans who sacrificed to Father Tiber. The superstitions of all the Southern races seem to have been pretty much alike at this time, and whatever force was near the river made votive offerings to it. The Huns, the Goths and the Vandals all hurled a large part of the plunder derived from their sacks of Rome into the ancient stream. "Such offerings were," says Professor Nispi-Landi, "the cause which contributed chiefly and for the longest period to enrich the bed of the Tiber with precious relics." Another cause, however, was the casting into the stream by the Romans of their possessions in order to prevent their being captured by enemies. For instance, after the defeat of Maxentius Saxa by Constantine, say the records, "Not only a great number of dead and wounded men and an immense quantity of arms and valuable objects, but even the treasures of Maxentius and the military chest of his army were thrown into the river to prevent their falling into the hands of the victorious foe." To save them from the Huns, and, later on, from the French, marbles, bronzes, statues, busts and costly images enriched the Tiber. Add to all this treasure the hundreds of rich Pagan statues and temple ornaments thrown into the river by the Christians, and the property of all who conspired to bring about the assassination of Cæsar, which had a similar fate, and an idea will begin to form of the vast treasures on the Tiber's bottom.

This Italian scholar, whose works, "*Rome before Humanity*" and *M. Agrippa and his Temple*," are, by the way, well known in Italy, has not by any means contented himself with the conviction that treasures in the aggregate are below Tiber waters. He has drawn up for himself a list of individual relics of which history speaks, and has attempted to locate each in one of his "zones," according to the details which he has been able to gather as to its sacrifice. For instance, the Professor believes that the sacred candlestick of Moses, the object that he would like best of all to recover, will be found in its first zone, or in that part of the Tiber near the famous Castel Angelo, close to the Vatican and St. Peter's, probably that part of the river that most Americans have seen.

Says the Professor: "It is certain that religious objects were left untouched by the superstitious Alaric and Genseric; indeed, in 509 and 529 the candlestick was still to be seen in Rome. I regard it as certain that the emblem ordered on Mount Sinai, which stood in the Tabernacle of King David, which was carried round the walls of Jericho and was venerated by Cæsar and Pompey, was eventually lowered by the Jews down from the bow of Esculapius's ship on Tibertine Island in our first zone. The Jews themselves always have asserted that it is there. Consider that more than 1,900 years have passed since then, and that the candlestick was then about 1,550 years old, making a total of 3,448 years! What importance would its discovery have? Who should have the greatest claim to its possession? How much should be paid to the discoverers? It is not easy to answer these questions. Everything should be as wonderful as the candlestick itself."

Professor Nispi-Landi will be one of the most disappointed men in the world if he does not bring up from the Tiber's bed thousands of suits of rich armor, of swords and shields, the property of the wounded men who through custom were hurled into the river and those that fell in the fearful battles on the bridges. Among these he expects will be the armor of brave old Horatius Cocles and his men, who kept the Pons Sublicius against the Etruscan army and finally leaped into the Tiber. "There must be," he writes, "in that part of the river arms, coins, ornaments, jewels, such as buckles, collars and rings, all rare and valuable as the only relics of the Romans and Etruscans of those days." He expects to find the famous Minerva statue of Phidias, as well as those of Hercules, Mars and Venus, with the pearl of Cleopatra. He believes he will bring to light the solid gold statue of Claudius II, which once stood in the Capitol and which was thrown into the Tiber to save it from the Goths.

Probably one of the first questions that will come into the mind of any one who reads this story of Professor Nispi-Landi's great project will be: If the Tiber is so rich in treasures, why has no one tried to get them before, or at least why has no one thought of doing so? Well, for hundreds of years men of an ingenious turn of mind have been pondering upon doing and attempting to do that precise thing. For his scheme of searching the Tiber's bed, Professor Nispi-Landi claims no originality; he claims only to be the first man who has yet set doing it with the proper mechanical devices. The list of those who in modern times have attempted to make the Tiber disgorge is headed by the name of the learned Cardinal de Polignac, who planned to deviate the Tiber from its course for about two miles, and then to dig for the antiquities which he believed were discoverable. Pope Benedict XIV smiled on the Cardinal's project, but while the necessary capital was being gathered the Pope died, and his successor was dissuaded from aiding De Polignac, on the ground that the climate of Rome might be injured.

In 1773, Don Alfonzo Bruzzi undertook the exploration of the Tiber by means of a cofferdam of his own invention. The device did not come up to expectation, for the water rose and overturned it. Yet, for the short time it worked, enough was found to pay all costs and leave a profit. The scheme of Joseph Naro, in 1815, was not so successful. He, too, believed the Tiber to contain treasure, but he tried to get it by means of a kind of mud-scraper, a "grattina," as he called it, which, whenever an incumbrance was met, was planned to strap it and draw it up. Only fragments of statues, marble blocks and funeral columns were, however, brought up by the

"grattina." Garibaldi dreamed of searching the Tiber, but he, too, wished to deviate the course of the river, and this the Italian Parliament refused to allow. The most recent man of celebrity to consider exploring the Tiber was the late Prince Alexander Torlonia. He, however, wanted to keep so much of what he found that the Government refused to grant him permission to make a trial. The Prince had felt so certain of success that he offered to deposit as a guaranty for the work the sum of a million and a half of lire, $300,000.

Professor Nispi-Landi believes that he at last will succeed. He says: "I have now fulfilled all the formalities required by the Minister of Public Works, and the ministerial decree will enable us, with new means and a positive and practical prospectus, to see the great river searched at last, and the abundant riches of intrinsic and artistic value of every ancient epoch triumphantly recovered. Let only fortune smile on our enterprise and merit and riches are ours!" — *London Correspondence of the Springfield Republican.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

APARTMENT-HOTEL, NOS. 204-6 WEST 72D ST., NEW YORK, N. Y. MR. ELLIOTT LYNCH, ARCHITECT, NEW YORK, N. Y.

LES ALISCAMPS; — VIEW OF THE AMPHITHEATRE, ARLES, FRANCE: AFTER AN OLD PRINT.

SEE article on "Roman and Romanesque France" elsewhere in this issue.

DOORWAY TO THE CLOISTER OF S. TROPHIME, ARLES, FRANCE.

GATES TO THE JAMES RUSSELL LOWELL MEMORIAL PARK, CAMBRIDGE, MASS. MR. JAMES T. KELLEY, ARCHITECT, BOSTON, MASS.

[Additional illustrations in the International Edition.]

ENTRANCE TO "THE BREAKERS": ESTATE OF CORNELIUS VANDERBILT, ESQ., NEWPORT, R. I.

SARCOPHAGI IN THE MUSÉE LAPIDAIRE, ARLES, FRANCE.

ROYAL ACADEMICAL HIGH SCHOOL FOR THE ARTS OF BUILDING AND MUSIC, CHARLOTTENBURG, PRUSSIA. HERREN KAYSER & GROSZHEIM, ARCHITECTS.

THESE illustrations are copied from *Deutsche Bauzeitung.*

NOTES AND CLIPPINGS

PETERBOROUGH CATHEDRAL'S WEST FRONT. — The restoration of Peterborough Cathedral has been completed, the scaffolding has been removed from the west front, and "the finest portico in Europe," as Ruskin styled it, is once more revealed in all its beauty. The walls have been most effectually secured, and the gables rebuilt where necessary, the old stones being used. It is 18 years since the restoration-work was begun; it has been carried out at a cost of $400,000. — *N. Y. Evening Post.*

RIGHT TO USE FLUES IN A PARTY-WALL. — Between the two buildings at 853 and 851 Lafayette Avenue, Brooklyn, there is a party-wall 12 inches thick. The building at No. 853 was erected first, and the flues in it extend 2 inches beyond the centre-line of the party-wall. When the adjoining building was constructed, flues for it were provided in the wall on the other side. A Mr. McKnight, the original owner of both buildings, sold No. 853 to Simon Batt before he built No. 851. The latter building he sold to Adelaide Kelly. Her attempt to cut into the flues in the party-wall was restrained by an injunction, and the action of the Supreme Court in doing so has been upheld by the Second Appellate Division. The cutting into the flues by the defendant caused the plaintiff's house to fill with smoke. Mrs. Kelly's contention was that, inasmuch as the flues extend 2 inches into her half of the party-wall, she could lawfully connect with them. A case cited by her counsel recognizing the principle that where flues are constructed in a party-wall for the common use of the contiguous buildings and accessible to either, they may be used by either, and another case where flues were built in a party-wall for the use of both houses, cannot be used, said Justice Hirschberg, for the Appellate Court, as authority to confer an easement upon one owner to use flues designed for the other owner where independent provision has been made for the former, and the use would be detrimental to the latter's enjoyment of his unquestioned rights. — *N. Y. Times.*

PROF. MCGEE AND THE AMERICAN INTERNATIONAL ARCHÆOLOGICAL COMMISSION. — Prof. J. W. McGee, of the Bureau of American Ethnology, one of the best-known scientists in the country, has been appointed by the President, through the Secretary of State, to represent the United States on the American International Archæological Commission, whose creation was recommended by the second International Conference of American States held in Mexico last winter. Each of the American Republics will appoint one or more members of the Commission, appointments to be for five years. Each Government interested will contribute to the expenses of the Commission on the same basis as that on which the Bureau of American Republics is supported. The idea of the Commission is to preserve the ruins of the principal prehistoric cities, establishing at each of them a museum to contain objects of interest found in the locality, and at such exhumed cities to establish conveniences for the visiting public. It will be the effort of the Commission to establish an American international museum in the city selected by the majority of the Republics participating in the work of the Commission which shall become the centre of all American archæological investigations and interpretations. — *Exchange.*

RIGHT TO LIGHT AND AIR. — In the case of Stevens *vs.* Salomon, Justice Steckler granted an injunction restraining the defendant, who was erecting an extension to the rear of the building 19 West Forty-second Street, thereby shutting off light and air from the windows. The plaintiff was a tenant of the building before it was purchased by the defendant in August last. Salomon collected rent for September and October, and in the latter month leased the premises to plaintiff for three years and six months from November 1. Justice Steckler said in part: "When the lease was made there was no structure in the yard interfering with the light and air coming into plaintiff's rear room. Although it does not appear that the plaintiff had a right of access to the yard, the light passing into the windows from the yard was essential to the beneficial use of the premises. The evidence establishes that at the time the lease was made it was the intention of the parties that plaintiff should have such use of the premises. To the extent of the light and air coming from the yard into the rear room the plaintiff was therefore entitled to an easement in the yard, and an attempt to change the condition of affairs to her detriment may be defeated by an injunction." — *N. Y. Times.*

TAKING DOWN A STEEL CHIMNEY. — The tallest steel chimney in New York was recently torn down. The stack, which was 18 feet in circumference, consisted of thirty sections, each weighing a ton. In taking down the chimney the workmen rigged up a scaffold about 10 feet from the top. Perched upon this support, they punched out the rivets that held the adjacent sections together, and lowered the two sections, weighing two tons, by ropes connected with windlasses. The scaffold was then lowered to the next two sections, where the disjointing work was continued. The removal of the chimney was effected at a cost of about $2,000. — *Boston Transcript.*

ITALIAN STREET-BOYS AND ARCHITECTURE. — The façade of a beautiful old church in Siena has been seriously defaced by boys, who discovered that sparks were emitted when they threw stones at the marble. When some French visitors protested last winter to the guardians of the church, it was said that the sport could not be interfered with, because for generations the boys of the town had been accustomed to amuse themselves at night in this manner. Three of the ancient windows in the Church of St. Etienne du Mont in Paris have been broken by boys throwing stones at them. — *N. Y. Evening Post.*

THE EPHESIAN FINDS. — "The more important 'finds' made by the Austrian archæologists in Ephesus," says the *Athenæum*, "are temporarily lodged for exhibition in the 'Tempel' of the Vienna Volksgarten. The latest of these is a rediscovered masterpiece of Greek sculpture which originally stood in the splendid market-place of Ephesus. It represents a boy of two or three years old, sitting upon the ground and holding a duck with his left hand, and is supposed to have been a companion work to the 'Boy with the Goose,' by the sculptor Boëthus of Chalcedon, which was praised by Cicero and Pliny, but is only known through later copies."

SUCCESS OF THE TURIN EXHIBITION. — The London *Times* correspondent at Rome says that the exhibition of modern decorative art at Turin closed November 15. The financial and artistic success of the exhibition, the correspondent observes, may be said to prove that what is known as the "new art" has taken firm root, and, having shaken off the grotesque and fantastic excrescences which marred its inception, is developing along lines assuring a future industrially successful and æsthetically wholesome. Incidentally, says the correspondent, the exhibition raises the question whether one of the effects of the huge modern fortunes may not be to create, especially in the United States, conditions under which masterpieces equal to the classic models may again be produced.

BRONZE HOUSEHOLD GODS OF THE JEWS. — The Musée Guimet, in Paris, the great storehouse of materials for the study of the history of religions, has received from the traveller Dinghello, now engaged in archæological work in Palestine, a number of recently discovered bronze images which, no doubt, are specimens of the household gods of the Jews so often mentioned in the Old Testament, but of which none had ever before been found. They show undoubted Semitic features. There are a Baal and an Astarte with plaited hair, the latter with a crown. The height of these images is 37 centimetres. — *Exchange.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, DECEMBER 6, 1902 No. 1406

CONTENTS.

SUMMARY: —
Frauds perpetrated on American Purchasers of reputed "Old Masters." — The Best being unobtainable it is worth while to put up with the Second-best. — Figure-painting. — Landscape-painting. — Death of Joseph M. Wilson, Architect and Engineer. — A new Up-town Court-house for New York suggested. — Parlor Matches and Fireproofed Wood. — Artistic and Inartistic Bridges. — The R. I. B. A. and the Vauxhall Bridge. 73
THE HENNEBIQUE SYSTEM OF ARMORED-CONCRETE CONSTRUCTION. — II. 75
LETTER FROM PARIS. 77
SOCIETIES. 78
ILLUSTRATIONS: —
Emanuel Church, Newport, R. I. — Interior of the Same. — Design for a Bank Building, Dubois, Pa. — Warehouse for Studebaker Bros. Manufacturing Co., Kansas City, Mo.
Additional: Vestibule of the German Section: Turin Exhibition of 1902. — The Main Entrance: Turin Exhibition of 1902. — The New Stadt Theatre, Cologne, Ger. — The Palladian Bridge: Wilton House, Wiltshire, Eng. — Derwent Hall, Derbyshire, Eng. — Bridges over the River Cam, Cambridge, Eng.: Clare Bridge; — King's Bridge. — Bridges over the River Cam, Cambridge, Eng.: Queen's College and Bridge; — Trinity Bridge. 79
NOTES AND CLIPPINGS. 79

THE New York *Evening Post* has a rather startling editorial upon the frauds practised upon rich American amateurs of works of art. Dr. Bode, the Director of the Berlin Museum, furnishes some of the material for this editorial, in an article in the new German artistic periodical, *Kunst und Künstler*, in which he traces the early history of some of the gems which now enrich great American collections; but the *Evening Post* has some information of its own to add, which goes to show that American amateurs of the present day, although richer than those of the last generation, and, as a rule, more familiar with works of art, are still unmercifully fleeced by the dealers and agents in Europe in whom they confide. As an example, the recent purchase of the Massarenti collection, in Rome, by Mr. Walters, of Baltimore, is mentioned. The *Evening Post* has a story to tell about this transaction which, for the present, it keeps to itself; but it justifies the warning which it gave when the collection was first offered for sale to Mr. Walters by quoting from Dr. Bode, who says that, "Whoever, like myself, has had the pleasure of seeing this collection knows that it would be difficult to name a second that is so void of good things, and contains so many mediocre pictures, and forgeries of great names." He adds that the Italian Government assessed a twenty per cent export tax of forty thousand francs on the collection, indicating that its experts valued it at two hundred thousand francs, or less than forty thousand dollars. The Italian appraisers were not likely to undervalue intentionally a collection of pictures to be shipped out of the country to an American purchaser; yet Mr. Walters is said to have paid five million francs for it, although, as Dr. Bode says, it "does not contain one noteworthy picture, one remarkable statue, or half a dozen works of a respectable mediocrity." It should be said that it does not follow from all this that Mr. Walters, who was brought up from childhood among the works of art collected by his father, one of the most discriminating amateurs that America ever produced, was deceived in his purchase. It is quite likely that he may have been imposed upon in the case of individual works, but if, as has been alleged, nearly all the experts and connoisseurs in Europe have for a hundred years been admiring, in the Sistine Madonna at Dresden, a copy, instead of an original Raphael, an amateur can hardly be expected to pass at first sight upon the genuineness of every work in a large collection; and it is much more likely that Mr. Walters was quite aware that the pictures were not of the first merit, but, knowing that pictures of the first merit of the Italian school are absolutely unattainable, and that works of the second merit will soon be equally so, he decided to take what he could get, and to pay what was demanded for it, rather than go without it. Nearly all our great museums have been glad to get specimens of Titian, or Rubens, or Rembrandt which would make but a sorry figure in the Salon Carré of the Louvre, but which, for all that, are priceless in America, as examples to students of the methods of the great painters. In the same way, although it is probably true that the Raphael recently purchased by Mr. Morgan has been offered to the European museums for a much smaller sum than Mr. Morgan paid for it, and refused, it does not follow that any amateur would ever have been able to buy it for the price which would have been accepted from a museum, or that, while it would probably be eclipsed by the Ansidei Madonna, on the Belle Jardinière, or the Madonna della Seggiola, it may not be of inestimable value to artists and the public in this country as the only available example of the one painter of the world in whose perfect art there is not a single false note.

ALTHOUGH men so thoroughly familiar with good art as Mr. Morgan and Mr. Walters, while they may be willing to pay high prices for inferior specimens, if these specimens are the best to be had, and cannot be purchased for any less, are not likely to be grossly deceived in what they are buying, it must be acknowledged that a great deal of trickery is practised upon American amateurs of less discrimination; and the *Evening Post* is justified in its desire that some method might be devised for equipping rich people who wish to buy pictures with the knowledge requisite for escaping deception. Unfortunately, our millionaires cannot often afford the time necessary for studying antique sculpture and cinque-cento painting, to say nothing of the lack of examples here to study; but we might suggest that it is always within the power of amateurs to observe the beauties of nature, and a person, particularly a person of the American race, the most sensitive of any to beauty, who follows his own instinct, cultivated by the observation of American sunset and sunrise skies, morning mists, flowers, and the faces and forms of young and innocent Americans, without allowing himself to be led astray by famous names, will not often be grossly deceived. If there is anything which impresses itself particularly upon the student of painting, it is that no one but a great artist can paint a beautiful face, as Americans understand beauty. The beauty may be of a superficial kind, like that of Greuze's smiling, pink-cheeked damsels, or it may be the ineffable purity and love of the Sistine Madonna, or of the Pre-Raphaelite saints and angels; but the amateur, particularly the American amateur, may be quite sure that if he sees in a picture a face that charms and touches him, the picture is worth buying, whatever may be the name appended to it; and, on the contrary, if the faces in a picture which he is asked to buy do not positively attract him, he had better let the picture alone, whoever may be its reputed author. It is true that there is often some quality in figure-painting which may give it value, independent of the beauty of the faces, as, for example, the color-effects in the curious daubs of Monticelli, or the tricks of chiaroscuro of some of the inferior Italians; but these qualities are easily copied, so that an amateur capable of appreciating them could not, without life-long study of details of touch, be sure of the genuineness of such pictures; while a beautiful face can never be copied, or, at least, can be copied only by an artist of as great power as the one who originally painted it. A painter of inferior capacity, whether he copies, or paints from nature, or from his own inspiration, can never get rid of the woodenness, or the theatrical exaggeration, or the affected simper which is in his own mind, and which, in spite of him, shows itself in his work. When he can get the affectation and insincerity out of his own mind, he can get it out of his painting, but not until then; and the man who can paint with absolute truth, either to nature or to his own ideal, is already great.

EVEN in figure-painting, the American eye, when unprejudiced by theories or fashions, is singularly correct in its judgment. It would be far too much to say that great artists have always led moral lives, or that morality alone can make a great artist; but we believe that most painters will say that no one who does not keep in his soul some little sanctuary of purity can paint the figure, particularly the nude, as the great artists paint it; and Americans, who are still preëminent in continence above all other civilized people, are, for that reason, quick to discover the apathetic indifference, the affectation, or, worst of all, the venomous brutality, with which the cold-blooded, the hypocritical or the degraded artist inevitably treats what to a great painter or sculptor is the incarnation of love.

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

IN regard to landscape-painting, it is much more difficult for the amateur to escape imposition than in figure-painting, but even here Americans, if they will forget all about schools, and pay no attention to the names signed on the pictures, are capable of excellent judgment. It would hardly be too much to say that American collectors were the first to discover the merits of the Barbizon School of French landscape painters. Corot was still neglected in France when American amateurs began buying his pictures, and many of the most beautiful pictures of Rousseau, Daubigny, Diaz, Corot, Ziem and others of the modern French school of landscape-painting were brought to America before their authors had become famous in France. This seems to have been the result of the greater quickness of Americans, sensitive by nature to landscape beauty, and indifferent to the artistic traditions and prejudices of the old world, to appreciate the truth of the new work; and the same instinct may be relied upon by the amateur to a much greater extent than is generally supposed. If he is careful not to put into a picture, from his own imagination, what is not really there, a form of self-deception which is not uncommon, the cultivated American, accustomed to feel the sentiment of actual landscape, can easily pick out of a dealer's or an auction-room collection the pictures which inspire in him the sentiment of the real scene. There are not likely to be many of them in an average collection, but those that do fulfil this condition are tolerably sure to be the work of great artists. Some of the artists may be young, and still unknown to fame, but their pictures may still be bought with confidence that the talent which produced them will meet with its reward in due time.

MR. JOSEPH M. WILSON, of Philadelphia, of the noted firm of Wilson Brothers, equally distinguished as an architect and engineer, died suddenly in his office a few days ago. Mr. Wilson was born in Phœnixville, Pa., sixty-four years ago, his father being an engineer of great distinction. Young Wilson graduated as a civil engineer at the Rensselaer Polytechnic Institute of Troy, N. Y., and after devoting himself for a short time to the study of analytic chemistry, took up engineering again in the service of the Pennsylvania Railroad Company. He was rapidly promoted, and, a few years later, was made "Engineer of Bridges and Buildings" to the Company. In 1873, he entered the competition for the buildings of the Centennial Exhibition in Philadelphia, in association with John McArthur, Jr., and was one of the ten architects selected for the work, the Main Exhibition Building and the Machinery Hall being entrusted to him, jointly with Henry Pettit. Although so much engaged in outside work, Mr. Wilson was still retained in the service of the Pennsylvania Railroad Company, and continued his connection with it for many years after the firm which he established with his brother, for engineering and architectural work, had grown famous. Naturally, much of Mr. Wilson's work in architecture was carried out for the Pennsylvania Railroad Company, for which he built the Broad Street Station, in Philadelphia, and many smaller ones; but he also designed, in connection, we believe, with Mr. Kimball, the Philadelphia and Reading Station, in Philadelphia, and was the architect of the Drexel Building, in Philadelphia, the Drexel Institute, the Presbyterian Hospital, and many other noted structures.

A NEW element has been introduced into the discussion over improvements in the New York Court-house by the declaration of Justice Truax, of the Supreme Court, Chairman of the Justices' Committee on court-house improvements, that it is impracticable to alter the present building by adding stories, in the way which has been suggested by the Municipal Art Society, so as to make it acceptable to the justices; and that, if the building cannot be extended on the ground, which is opposed by the Municipal Art Society, as well as by all those who interest themselves in the preservation of the Park, it would be best to abandon it, and build a new and modern court-house at least as far up town as Twenty-sixth Street. There is, apparently, no reason why this suggestion should not be carried out, to the advantage of the courts, which would find in the neighborhood of Madison Square better air and light, and less noise, than on Chambers Street, and also to the advantage of the City-hall Park, from which the old building could be cleared away. Some of the newspapers express the fear that the removal of the court-house from the Park would be inconvenient for lawyers, many of whom have offices in lower Broadway; but most lawyers care very little about being near the court-house, proximity to their clients being with them a much more important consideration. In fact, very many eminent lawyers never go into a court-house, devoting their time entirely to consultations, and leaving to assistants or junior partners the care of filing papers and conducting cases. This is especially true of New York, and, if the court-house should be moved to Madison Square, very few legal firms would think of following it.

THE city of New York is likely to be made, in time, as safe against fire as Vienna, if official action can bring about that result. Notice has already been given that the storage, sale and use of parlor matches in the city will be prohibited after January 1, next; and it is quite likely that the use of gasolene may be next regulated; and, in another branch of official activity, Commissioner Stewart, of the Department of Buildings, has been vigorously enforcing the law in regard to the use of fireproofed wood in lofty structures, more than one hundred thousand feet of this material, which had been tested by the department experts, and found defective, having been rejected in a single week.

IT is astonishing that a city like London should think of building, or, rather, of rebuilding, a great bridge without the aid of a trained artist. The Tower Bridge, although the architect who designed it was an official, known more for his amiability and business talent than as an artist, meets with considerable cleverness and success a very difficult artistic problem; and the Vauxhall Bridge is not only more conspicuous, but lends itself far better than the Tower Bridge to artistic treatment. In Paris, where all the permanent bridges, except the railway viaduct, are beautiful, and the last, the Alexander Third Bridge, is one of the most masterly examples of metal-work design in existence, or in St. Petersburg, where designs for two bridges have lately been thrown open to competition among architects of all nations, or in New York, where designs for new bridges must not only be made under the supervision of the very accomplished architect attached to the Bridge Commission, but must receive the approval of the Art Commission, the idea of giving an engineer license to indulge his notions of the "Gothic" style in cast iron in one of the most conspicuous bridges in the city would be received with universal protest; and it is strange that London should be contented with what the Muscovites and the Yankees repudiate. Even Boston, which possesses few bridges, and those of a very inconspicuous character, has been careful to commission an architect to advise in the design of a simple "rapid transit" bridge; while its park bridges, some of which are of considerable importance as engineering structures, are models of variety and beauty, having been designed by different architects, selected for the purpose. As for the cities of a more ancient civilization it is interesting to imagine what the Florentines of the Renaissance would have thought of a scheme for putting an iron bridge, designed in engineers' Gothic, across the Arno, or what the Romans would have said to such a proposition. The city of London is so rich that it is reproached with the recklessness with which it spends money on objects of doubtful utility, and it can certainly afford to devote some thought, if not money, to the agreeable appearance of one of the most conspicuous objects in the Metropolitan District.

THE Royal Institute of British Architects has petitioned the London County Council to join an architect with the engineer of the new bridge which is intended to replace Vauxhall Bridge. Apparently, the designs for the proposed structure have been prepared exclusively by an engineer, who has conceived them in what he imagines to be the "Gothic" style. They have, through the courtesy of the officials, been examined by the Council of the Institute, and architects will be quite ready to believe that the Council puts the case mildly when it says that, if they are carried into execution, the bridge will be a "discredit" to the art of the century. The Council represents, in colors none too strong, the importance of giving to a monument so conspicuous as a great bridge an artistic character; and, while expressing its wish that engineering exigencies might permit the erection of a bridge all of stone, it says that even one of iron and stone can, and should, be artistically designed.

THE HENNEBIQUE SYSTEM OF ARMORED-CONCRETE CONSTRUCTION.[1] — II.

I HAVE now described in particular the different elements which compose a building designed on the Hennebique system; but it yet remains to prove their resistance to fire. Of the many tests which M. Hennebique and various European Governments have made on buildings of his design, I will describe the fire-test of a two-story pavilion

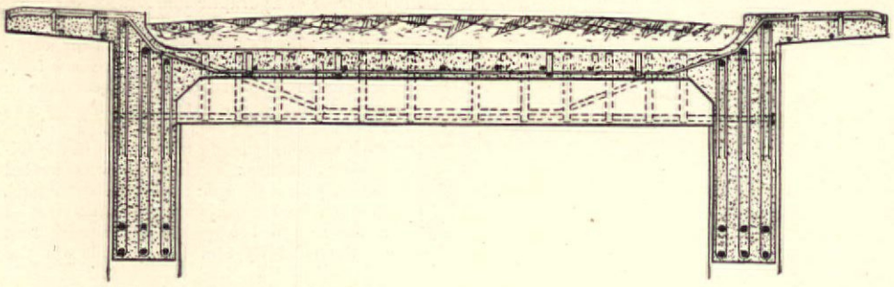


Fig. 17. Cross Section of a Bridge.

at the Exhibition of Ghent, in Belgium, in 1899. This pavilion, measuring 20′ x 15′, was built entirely of ferro-concrete, and the windows and doors were provided with Siemens wire-glass. In all, two tests were made. In the first test the second floor was loaded with 300 pounds per square foot, or one and a half times the load for which it was designed, and a deflection of $\frac{1}{8000}$ of the span was produced. On September 9 the lower room was filled with about 220 cubic feet of wood and coal. This material was sprinkled with petroleum and set on fire. The conflagration lasted one hour, and produced a temperature of about 1,300 degrees Fahr. The walls were red hot on the inside; yet, notwithstanding that their thickness was only $4\frac{3}{4}$ inches, the hand could easily be held on the outside without experiencing any discomfort.

The temperature of the second floor increased only 4 degrees, which means that no mercantile product whatsoever would have suffered damage. The deflection of the floor increased to $\frac{9}{16}$ of an inch, but two hours after the extinction of the fire was diminished by $\frac{1}{8}$ an inch, so that under a very heavy load the permanent deflection resulting from the fire was scarcely perceptible.

In order to prove that an armored-concrete floor which had been subjected to fire was still capable of bearing the same loads as before, M. Hennebique made a new test on September 28; this time loading the floor with 400 pounds per square foot, or double its intended load. When the 300 pounds mark was reached the deflection was found to be precisely the same as before the first test. At 400 pounds per square foot the deflection was only $\frac{1}{8}$ of an inch.

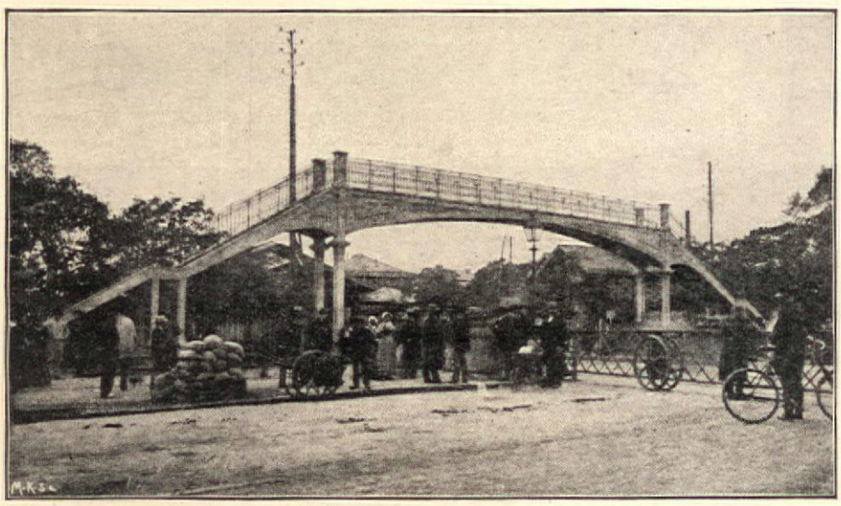


Fig. 19. Footbridge over Railroad, Lorient, France.

The lower room was completely filled with wood and coal, the upper room partially filled with the same materials, and the roof was loaded with 200 pounds per square foot. At six minutes past four the fire was lighted on both piles and lasted until half-past six. The fire played so fiercely against the sides and ceiling that the plastering of the latter was calcined, and the wire-glass of the windows and doors melted.

The building was momentarily forced out of shape (expanded), but showed no cracks and only very fine fissures, which in no case let the hot air escape. Again the contact of the hand with the outside of the walls could easily be endured. The deflection of the second floor reached a maximum of $\frac{3}{4}$ inch at twenty minutes to six; after this time no further increase could be observed.

At half-past six, when, after continual firing, no change in the state of the building could be detected, the commission agreed to extinguish the fire, which was done by directing a stream of water from a hose against the walls and ceiling and afterward against the coal-piles.

When, on the following day, the fire-authorities examined the building, it was found that the conflagration had not injured the general structure in any way. There was no permanent set in the floors and the few fissures caused by the expansion were completely closed. A series of pyrometers indicated a temperature of 2,200 degrees Fahr.

Lime-kilns, constructed entirely of concrete, dispensing with fire-bricks and steel shell, have endured for years a temperature of 2,200 degrees to 2,500 degrees Fahr.

From every point-of-view armored-concrete buildings are superior to those of any other type. They are monolithic; settlement of the ground is properly transferred and equalized by means of their enormous stiffness; they consist of practically one material, and variation of temperature cannot produce unsightly cracks; they become stronger with age, concrete forming an artificial stone better than the best stone which ever came from a quarry; the buildings are cool in summer and warm in winter.

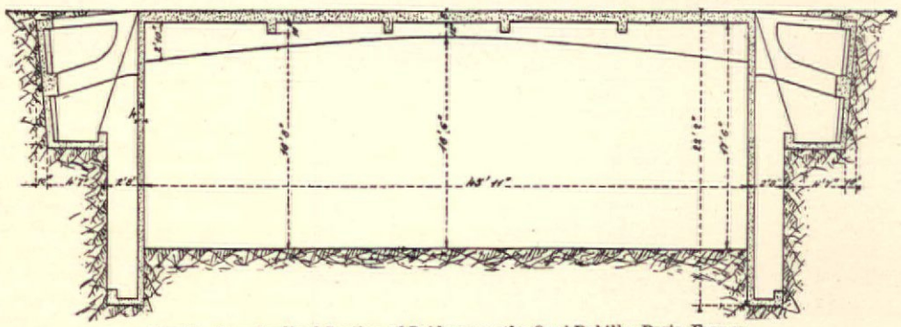


Fig. 18. Longitudinal Section of Bridge over the Quai Debilly, Paris, France.

Considering, moreover, the facility with which the materials can be procured, so that only a few months are needed to erect the largest building, together with the surprisingly low cost, it must be evident that the time of steel-skeleton buildings, with all their flimsy lug and bracket connections, their insufficiently protected columns and their high cost, is past, and that they must give way to a far superior type which will be the construction of the twentieth century.

The photographs show the great range of work done by M. Hennebique, including factories of all kinds, as flour and spinning mills, ice-factories and foundries with heavy travelling-cranes, the runways being also of concrete-steel, smoke-stacks, storage-houses and power-blocks, apartment and office buildings of fifteen stories in height, department-stores, theatres, museums, banks and fireproof vaults, domes and churches, markets, railroad-stations and small switch-houses, free-supporting staircases, floors of any practical span (those in the Grand Palace of Fine-Arts in Paris having a span of 33 feet and a cantilever of 11 feet), exhibition-buildings, coal-bins, water-towers, grain-elevators, power and irrigation canals, tunnels, retaining-walls, wharves and piers, and (last, but not least) bridges.

Armored-concrete bridges are indestructible, requiring no supervision or repairs. If of moderate span, they are cheaper than steel bridges and have always a fine architectural appearance.

[1] A paper by Mr. Leopold Mensch, C. E., read at a meeting of the Civil Engineers' Club of Cleveland, and printed in the *Journal* of the Association of Engineering Societies. Continued from No. 1405, page 70.

Through the columns of *Engineering News* of this year, we have learned the disastrous results of adopting the so-called "leg bridges" for country roads. They consist of steel pipes, forming the abutments, and plate or lattice girders carrying the floors, the two being connected by brace-angles. They failed by scores. A few concrete-steel piles and a 4-inch curtain-wall as abutments, a few armored-concrete piles mid-span and a concrete-steel floor, monolithically connected with these piles, will make a bridge as cheap as a "leg bridge," but far better and indestructible.

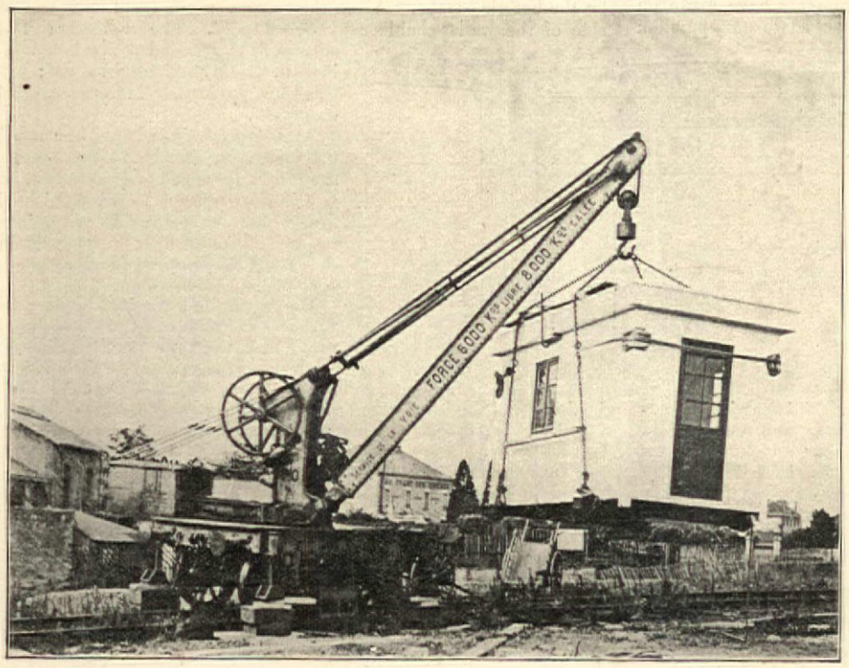


Fig. 20. Transportable Guard-house for Orleans Railroad, France.

Figure 17 shows a typical cross-section of a ferro-concrete bridge of moderate span. The floor of the roadway and the cantilever sidewalks form the compression-flange, while the rods in the bottom of the girders proper form the tensile-flange of a huge girder, and, for the same reason as in floors, this type of bridge is much stiffer than are plate-girder bridges. The cross-girders, roadway and sidewalks are all built of ferro concrete.

Figure 18 shows a longitudinal section of the bridge of the Quai Debilly, in Paris. This is composed of twelve armored-concrete arches of 46 feet span, placed about 8 feet apart. The rise is 2 feet, or $\frac{1}{23}$ of the span. The floor for the roadway and sidewalks varies in thickness, and is supported by armored-concrete cross-girders and is about 100 feet wide. The abutments and foundations, also built of armored concrete, are of special design.

Figure 23 shows a section through the retaining-walls. A curtain-wall, 6 inches thick, is connected by means of deep ribs with a platform at mid-height. This platform supports a load of earth 10 feet deep, which in the simplest manner prevents overturning of the walls. The bridge was calculated for a uniform load of 123 pounds per square foot, and for a train of 10-ton wagons. It was tested on February 6, 1900, by a uniform load of 123 pounds per square foot, 248½ tons in all, and gave a maximum deflection of only ¼ inch, or $\frac{1}{2154}$ of the span.

A second example is the bridge of Chatellerault, over the river Vienne, in France. This is the greatest work of art that has been constructed on the Hennebique system. The total length of the bridge is 443 feet, and consists of three spans, the end spans of 135 feet with a rise of 13 feet, and a central span of 164 feet and a rise of 15 feet 8 inches. Four arched ribs in armored concrete, 20 inches deep, support the floor of 25 feet width by means of 8″ x 8″ posts. The sidewalks partly overhang. The total thickness of the bridge at the crown is only 28 inches.

It will be noticed that this bridge is designed on the same lines as would be expected in steel-arch bridges, such as the Washington Bridge in New York; and the lightness of this structure explains its surprisingly low cost of hardly $35,000.

The foundations of the bridge were easily laid, the calcareous rock being found at 5 feet below low-water mark. The piers and abutments consist of heavy ribs, corresponding to the four arched ribs and connected by curtain-walls 5 inches thick, to give them their external shape and stiffness. They were filled with low-grade concrete of hydraulic lime.

The bridge was calculated for the passage of two 16-ton wagons, and for a uniform load of 100 pounds per square foot. The concreting of the bridge was done in less than three months, and five weeks later the centring was removed. The tests with stationary loads were made in the following manner: each span was loaded over its total length, then on each half, then on its central part, with moist sand at the rate of 165 pounds per square foot on the roadway and 123 pounds on the sidewalks.

The official report of the test says: —

The maxima of the deflections were ¼ inch for the arch of the left shore, $\frac{7}{32}$ inch for the arch of the right shore, and $\frac{13}{32}$ inch for the central arch, that is, $\frac{1}{1800}$ and $\frac{1}{5000}$ of the spans respectively. The specifications allowed deflections of $\frac{9}{16}$ inch for the 135-foot span and of 2 inches for the 164-foot span. After removing the loads no permanent deflection could be detected.

The moving-test load was composed of: —

First. — One 16 ton steam roller.

Second. — Two two-axle wagons weighing 16 tons in all.

Third. — Six single-axle wagons weighing 8 tons in all; making a total of 40 tons moving simultaneously over the bridge, the sidewalk of which had to carry also 80 pounds per square foot. The maximum deflection reached was less than $\frac{1}{6000}$ of the span.

Furthermore, 250 infantrymen were made to cross the bridge, first in ordinary marching order, then in double-quick time. Also, strips of wood were strewn over the roadway in order to produce shocks when the steam roller passed over them.

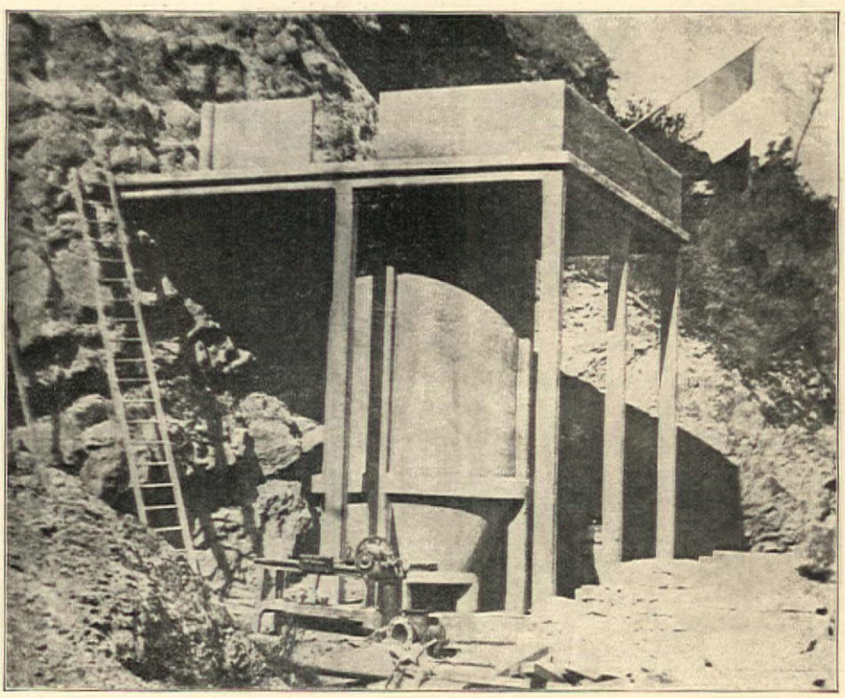


Fig. 21. Limekiln, Luzech, France.

But the most remarkable feature shown by these tests was that the three arches were in fact continuous, so that the load which caused a depression in one arch produced at the same time a rise of the other arches, an evident proof that ferro-concrete structures are monoliths.

You will be surprised at the numerous applications of the

Hennebique system. The explanation is simple. The inventor has been able to interest in his system a great many engineers, architects, practical and scientific men, who have imparted to him their ideas and have become his collaborators.

Europe is to-day in the lead of concrete-steel structures. Let us hope that the enterprising American spirit will, as energetically as formerly with regard to steel, take up and lead in this, which is undoubtedly the greatest industry which we have to expect in the twentieth century.

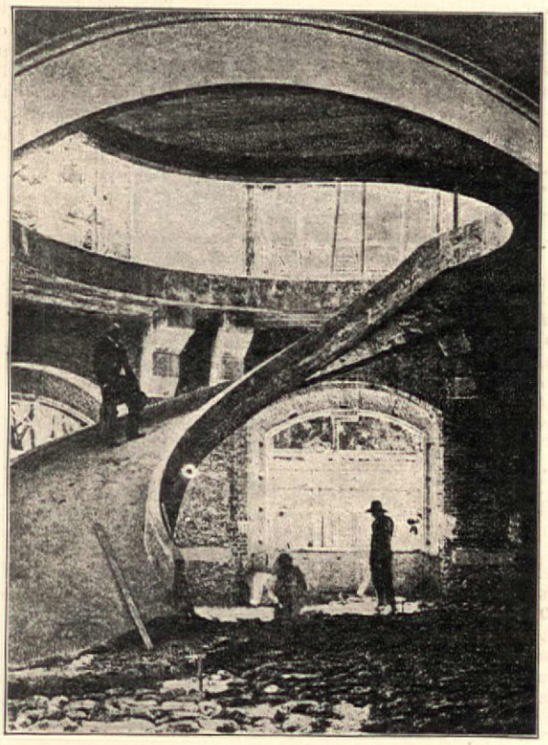


Fig. 22. Staircase in the Palace of Fine-Arts, Paris Exposition of 1900.

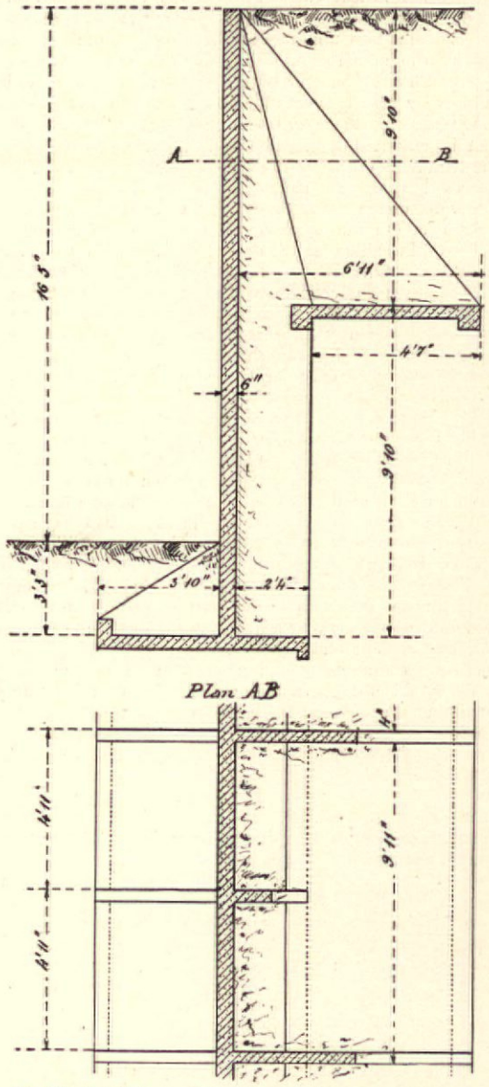


Fig. 23. Retaining-wall of the Quai Debilly, Paris, France.

PARIS

DIPLOMAED AND NON-DIPLOMAED ARCHITECTS. — THE DRY-ROT FUNGUS AND THE RESPONSIBILITY OF ARCHITECTS.

THE profession of the architect is not, in France, an easy one to practise, yet, demanding, as it does, a multifarious practical knowledge and a certain amount of artistic education, it is nevertheless open to every one, and each man can, between one day and the next, assume the title of "architect" without having had to furnish any proof of his capacity. Being obliged to fill the delicate office of proxy for another, an architect is not compelled to give any bond to the man whose interests he undertakes to defend. Physicians cannot practise medicine until they have won the title of "doctor," advocates cannot plead in court until after they have obtained from the Faculty of Law the title of "licentiate," and have passed several examinations; and from engineers are exacted diplomas declaring their successful passage through the great schools of the State. But from the architect nothing is demanded.

The École des Beaux-Arts does, indeed, confer a diploma declaring that an architect has there completed certain studies in a satisfactory manner, but this diploma is a very special affair, and, consequently, elective, and many capable architects cannot have a diploma although they have passed through

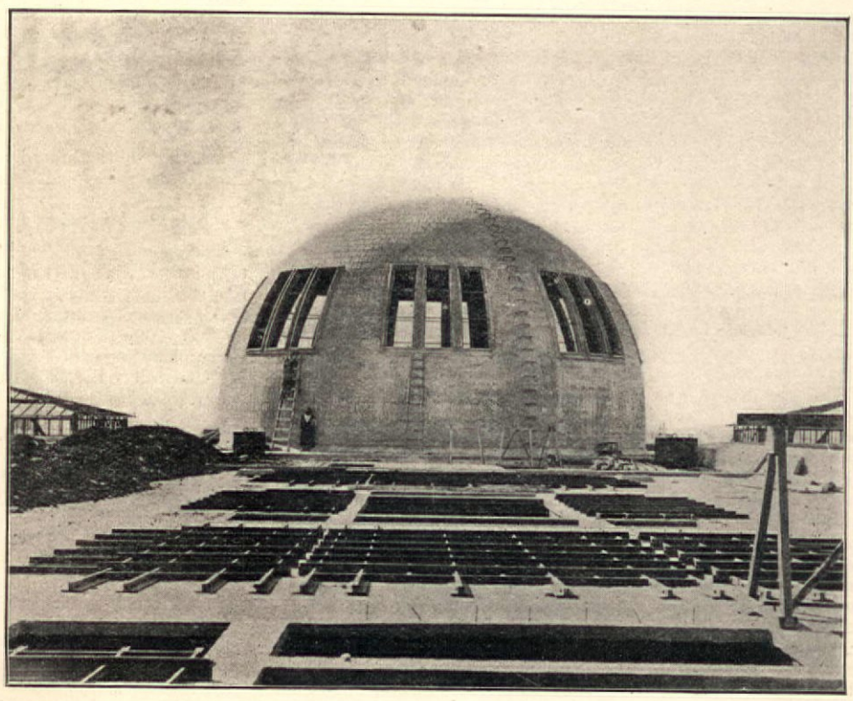


Fig. 24. Dome of the Museum of Egyptian Antiquities, Cairo, Egypt.

the École des Beaux-Arts. The non-diploma-owning architects, especially in the Provinces, complain of the competition they are forced into with architects who have gained their diplomas; while the latter, on their side, express their regret that the obligation of winning a diploma does not defend them against the ignorant and the charlatans who encumber and dishonor the profession.

For a long time this matter of the diploma has been under discussion, and every year it makes its appearance in the programmes of our Congresses, but there will be a great deal of trouble in bringing it to an issue. A diploma, in the first place, can only be pertinent to the technical and scientific side of our profession. Art cannot be described by any certificate, and a client, amateur of modern art, might well mistrust the worth of a diploma issued by our National School. On the other hand, a technical education can be had as well at Marseilles, at Toulouse, at Lyons, in the North, as well as at Paris. One cannot demand that all the architects in France should learn their trade at Paris; there should, therefore, be created in the Provinces regional schools, and this is an aspiration which has been frequently expressed, and which will shortly result in something. But if a diploma should be definitely adopted would it give a satisfactory remedy for the evils of which we at present complain?

At the late Congress, last June, M. Fernoux declared that it would not: a diploma could never confer upon those who have won it the sole right of conceiving plans and carrying them into execution; could never possibly prevent a contractor from building a house, or a client from purchasing this house after it had been built. Since, then, he had the right to purchase it, he must also have had the right to cause it to be built by any one that he chose. The selection of an architect depended upon that which the client wished him to perform. There were cases where a practical man was of more use to a client than an artist would be, and choice in most cases is usually made only after making inquiries, and gathering information as to the capacities of the man who must defend the client's interests. Even though all architects should be diplomaed, in one fashion or another, this would not prevent the client from making inquiries before entrusting an architect with his business; just as he makes inquiries before selecting a physician, an advocate, or an engineer. And this is why the eternal question of the diploma, so much discussed in France, arrived at no definite conclusion this year any more than in former years, and explains why the propositions advocated were not adopted.

Architects, therefore, will probably have for a long time yet to enter a competition which expands ceaselessly. Like all professions, that of the architect is to-day very much crowded in France; and, nevertheless, it is not among the most easy and most tranquil. The architect in France has to observe police-regulations, and very stringent street-front laws which constrain his free action, in sometimes an excessive degree; and, besides, for the last ten years he has had to bear a responsibility which may be terrible in its consequences, and against which all his knowledge and his experience cannot always preserve him. You will find the proof of this in the extremely interesting discussion at the last Congress, apropos of the dry-rot fungus, the "merulius lacrymans," with which the Congress of 1901 also concerned itself. This fungus causes considerable damage in wood, and because of the severity of the *code civil* in this respect, an architect may find himself in a position of responsibility for the damage it produces.

So far as concerns the "merulius lacrymans," is not this responsibility excessive, and can the danger of using the lumber be recognized at the moment when it is introduced into the building? Can the ravages of this growth be stopped? These are the questions which have been discussed in the remarkable report at the last Congress by M. Olive, Architect and Secretary of the Société Centrale. M. Olive, in the first place, described the ravages caused by the "merulius lacrymans" on which, in 1893, M. Crié, of the Faculté des Sciences de Rennes, laid the failure of many scaffoldings in several cities of France, and the falling of innumerable roofs and floors. The same condition of things exists abroad — in Austria, Russia, Germany, where able botanists are carrying on special studies in this subject. In 1898 a commission was appointed by the Association Internationale for the Testing of Materials, with a view to studying this very question of the dry-rot fungus. Thanks to the studies of this commission, there have been obtained certain facts, which, to some degree, give us a definite knowledge of this redoubtable enemy. From these investigations it appears that the rotting of the wood can be very rapid, and that it is often caused by mushrooms which attack the tree while it is still growing. The vegetable fibres of these mushroom growths are invisible to the naked eye, and can only be seen through the microscope by observers familiar with vegetable anatomy. Botanists, at least, might be able to recognize the presence of this fungus growth at the time of felling. But there is another kind of decay which cannot be discovered at the time of felling, and which reveals itself only after it has reduced the pieces of wood to powder — the principal agent in this decay is the "merulius lacrymans." Wood affected by it presents a yellowish-brown color, and is covered by light specks of clear white, which have the appearance of filaments of gray cotton-batting interwoven with one another. These form irregular white sheets, in the midst of which appear yellowish plaques in the form of little flakes, which finally become covered with bright orange-colored dust, formed by the innumerable spores or seed-vessels of the fungus. This fine dust is easily scattered, and can thus infect sound wood. Fortunately, all these seeds do not germinate and only a small portion meet with conditions favorable for their development. Among these favorable conditions humidity is of the chief importance. Certain remedies have been suggested for stopping the propagation of the evil: creosote, currents of dry air, dilute sulphuric-acid, sulphate of copper (one kilogramme to 10 litres of water).

"In any event, for us architects," M. Olive says, at the end of his essay, whence I have drawn the statements herein, "it is enough to state that botanists, men conversant with such matters that is, confess their inability to detect this plague early enough to take precautions against it, and that they have not yet found any efficacious means of stopping its growth, and causing it to disappear. This being so, why should the architect be held responsible for a destruction caused by the fungus? Yet, nevertheless, judgments have been given compelling both architect and contractor to indemnify the owner of the building for loss occasioned by the "merulius lacrymans." On the other hand, a recent decree of the Conseil d'Etat has settled the jurisprudence of the matter in a more reasonable sense. The floor of one of the halls in a certain school fell; the experts recognized that the catastrophe was brought about by the rotting of the wood caused by the fungus, whose existence had not been detected when the wood was being built in. The Conseil d'Etat dismissed as defenders both the architect and contractor alike; and this is the theory that M. Olive would like to have recognized everywhere, and there is no architect who will be found to oppose him. Supporting this conclusion, M. Lalanne, Vice-President of the Société Centrale, would like to see the same principle applied to the cases where wood is destroyed by the worms vulgarly called "*vrillettes*," whose inroads always begin in the builder's yard or in the house.

M. Moyaux recalls in this connection that having to tear down a small house, about thirty years old, he discovered that all the timber, flooring and beams were attacked by these "*vrillettes*," and that posts 18 to 20 centimetres square were reduced to the thickness of an umbrella. All this is not very reassuring; hence, the following expression of opinion has been unanimously adopted at the Congress of 1902: —

"In consideration of the fact that it is practically impossible to discover, in wood apparently sound at the time of being built-in to a structure, the presence of a deposit of eggs which will engender "*vrillettes*," or of spores which later must develop the filaments of the "merulius lacrymans"; and considering, further, that this deposit can be made at any moment, through an external agency, the Congress expresses the belief that the responsibility of the architect in such cases should not be involved."

And now let us hope that this aspiration may be taken into consideration by the tribunals, and that the courts may show themselves less harsh toward architects, whether or no they have won their diplomas, — the "*vrillettes*" and the "merulius lacrymans," unfortunately, not being influenced by diplomas.

AMERICAN INSTITUTE OF ARCHITECTS.

PROGRAMME of the Thirty-sixth Annual Convention, to be held in Washington, D. C., December 11, 12 and 13, 1902.

Order of Proceedings. — Wednesday, December 10.

Meeting of the Board of Directors at 10 A. M. in the Octagon, Eighteenth Street and New York Avenue, Washington, D. C.

Thursday, December 11.—*Morning Session.*

The members of the Institute will meet in the Assembly-rooms of the New Willard Hotel at 9.30 o'clock; will register their names; the President will appoint a Committee of Three on Credentials of Delegates, and at 10 o'clock there will be a short address of welcome by Col. John Biddle, U. S. A., Engineer Commissioner, District of Columbia, after which the President of the Institute, Mr. Charles F. McKim, will make brief remarks, when the Convention will be declared open for business.

Order of Business.

1. Report of the Board of Directors.
2. Report of the Treasurer and reference to the Auditing Committee.
3. Reports of Chapters, a synopsis of which will be read by the Secretary.
4. Reports of the Standing Committees: —
   - (*a*) House and Library Committee, Robert Stead, *Chairman.*
   - (*b*) Education and Publication Committee, H. L. Warren, *Chairman.*
   - (*c*) Foreign Correspondence Committee, Glenn Brown, *Chairman.*
   - (*d*) Contract and Lien Laws Committee, Alfred Stone, *Chairman.*
   - (*e*) Applied Arts and Science Committee, W. G. Preston, *Chairman.*

5. Reports of Special Committees: —
   (*a*) Legislative Committee on Government Architecture, George B. Post, *Chairman.*
   (*b*) Delegate to National Conference Electrical Code, and to meeting of National Fire Protection Association, Alfred Stone, *Delegate.*
   (*c*) Conference with Architectural League on Competition, Codes and Coöperation, R. Clipston Sturgis, *Chairman.*
   (*d*) Committee on Competitions, R. Clipston Sturgis, *Chairman.*
   (*e*) Improvement of Washington Committee, W. A. Boring, *Chairman.*
   (*f*) Fine-Arts Commission and Bureau of Architecture Committee, Robert S. Peabody, *Chairman.*
   (*g*) Municipal Improvement Committee, Frank Miles Day, *Chairman.*
   (*h*) World's Congress Committee, W. S. Eames, *Chairman.*
   (*i*) Metric System Committee, James Knox Taylor, *Chairman.*

Luncheon served in banquet-hall at 1 o'clock. Ladies in attendance with members are invited.

Afternoon Session, 2 o'clock.

1. Appointment by the President of two Committees on the Nomination of Officers and Place of Meeting for Thirty-seventh Convention.
2. Appointment of Special Committees to consider and report on recommendations contained in the Report of Board of Directors, of the Reports of Chapters, and of the Standing and Special Committees.
3. Papers on "The Improvement of Washington," illustrated by lantern-slides.
   (*a*) Daniel H. Burnham.
   (*b*) Frederic Law Olmsted, Jr.
   (*c*) Charles Moore.
4. Report of Credential Committee.

Evening Session.

The members will meet at the Library of Congress at 8.30 o'clock to view drawings and models submitted by the Park Commission, D. H. Burnham, C. F. McKim, Augustus St. Gaudens, and Frederic Law Olmsted, Jr. Explanation by member of the Commission.

Friday, December 12. — Morning Session.

1. Paper: "The Relations of the Architect and the Engineer" — Captain John Stephens Sewell, Engineer Corps, U. S. A.
2. Reports of Special Committees.
3. Unfinished business of the previous day.
4. Ballot open for the election of officers.

Luncheon served in the banqueting-room at 1 o'clock.

Afternoon Session, 2 o'clock. — Held in Assembly-hall of the New Willard.

The Development of Municipal Improvement will be the principal topic for consideration. Papers and discussions illustrated by lantern-slides.

   (*a*) W. B de las Casas. "The Organization for Municipal Improvements."
   (*b*) Albert Kelsey. "The Modern City."
   (*c*) Owen Fleming. "Improvements in London, Eng."
   (*d*) E. L. Masqueray. "Water Effects in Landscape as applied in St. Louis Exposition."

Saturday, December 13. — Morning Session.

1. Reports of Committees appointed at the opening session and their consideration.
2. Unfinished business.
3. Miscellaneous business.
4. Ballot closed and announcement of officers elected and the place of meeting for the next Convention.

Afternoon Session, 2 o'clock.

1. Unfinished business.

Exhibitions, December 10 to 14.

1. Drawings and photographs illustrating the proposed improvements of Washington by the Park Commission; on view in the Congressional Library.
2. Exhibition of the competitive drawings for the new Municipal Building, Washington, D. C., in the Octagon, corner Eighteenth Street and New York Avenue, N. W.

Delegates will be distinguished by a red ribbon, and will occupy seats from the front row as far back as is necessary for their accommodation.

Members of the Institute who are not delegates are entitled to enter all discussions, to offer resolutions and motions, and to vote on a proposition that it is "the sense of the meeting."

Prompt and full attendance on the successive sessions at the hours indicated is requested, otherwise the business of the Convention cannot be fully accomplished.

Committee of Arrangements. — Glenn Brown, Robert Stead, Wm. A. Boring, Edgar V. Seeler.

Per order of the Committee,

GLENN BROWN, *Secretary, A. I. A.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

EMANUEL CHURCH, NEWPORT, R. I. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.

INTERIOR OF THE SAME.

DESIGN FOR A BANK BUILDING, DUBOIS, PA. MESSRS. DAVID C. MYERS AND MAHLON L. FISHER, ASSOCIATE ARCHITECTS, WILLIAMSPORT, PA.

WAREHOUSE FOR STUDEBAKER BROS. MANUFACTURING CO., KANSAS CITY, MO. MESSRS. ROOT & SIEMENS, ARCHITECTS, KANSAS CITY, MO.

[Additional illustrations in the International Edition.]

VESTIBULE OF THE GERMAN SECTION: TURIN EXHIBITION OF 1902. HERR P. BEHRENS, ARCHITECT.

THE MAIN ENTRANCE: TURIN EXHIBITION OF 1902. SIG. R. D'ARONCO, ARCHITECT.

THIS and the foregoing plate are copied from *Art et Decoration.*

THE NEW STADT THEATRE, COLOGNE, GER. HERR KARL MORITZ, ARCHITECT.

THIS plate is copied from *Deutsche Bauzeitung.*

THE PALLADIAN BRIDGE: WILTON HOUSE, WILTSHIRE, ENG. SIR WM. CHAMBERS, ARCHITECT.

DERWENT HALL, DERBYSHIRE, ENG.

BRIDGES OVER THE RIVER CAM, CAMBRIDGE, ENG.: CLARE BRIDGE; — KING'S BRIDGE.

BRIDGES OVER THE RIVER CAM, CAMBRIDGE, ENG.: QUEEN'S COLLEGE AND BRIDGE; — TRINITY BRIDGE.

NOTES AND CLIPPINGS

ECONOMIES OF THE SO-CALLED STEEL TRUST. — The December *Century* contains a paper on the "Steel Trust," by Henry Loomis Nelson, which embodies statements of an authoritative character concerning that organization, including the paragraphs which follow, setting forth the claims of the Corporation as to the economies which it has brought about. Mr. Nelson says: "Among the leading causes of low prices is low cost of production, and this is obtained by the economies which the combination has rendered possible. The fact that economies are possible is clear. In the first place, not one of the subsidiary companies possessing ore owned every kind of ore which it needed in its work. The Illinois Steel Company and the Carnegie Company, for example, were obliged to purchase ores for mixing with their own. The United States Steel Corporation buys no ore. In the second place, there is an enormous saving in the item of transportation. The great fleet of the Corporation sails about the lakes, stopping at the mines for loading, departing at once on receiving the cargo, notified then or on its passage at what wharf and for what furnace the ore is to be delivered. There is no loss of time, as there used to be when the boats, belonging to different and competing companies, were obliged to wait their turn at the loading-wharf, while there was further delay at the destination, either by reason of failure of land transportation, or because the furnace was not ready for the ore. Now the ore is carried directly to the furnace at which it is needed, and the former waste is saved. Another economy

is the consequence of the possession by the company of virtually a complete equipment for the iron and steel business. Orders that once were taken by one mill can be distributed among the several mills which formerly were competitors. This not only secures promptness in executing the orders, but where once the mill machinery was changed as it passed from the making of one size to the making of another of pipes or rods or other forms, there is now no such loss of time, for sizes, like forms, can be distributed to the proper number of mills. There is also economy in administration; there is no waste of effort and of men in competition for orders; and the product once sold through scores of agents is now disposed of by a few. But the chief advantage of this combination is expected to be gained through economy of production, not in the number of salaries saved, and not merely in the utilization of existing methods and means of manufacture. No one can question the fact that in competition there is great waste; the question is whether the consumer gains or loses by the struggle which results in this waste. It is true, however, that those who now are interested in the United States Steel Corporation have been saved enormous expenditures of material, and have also been saved losses which might have brought serious disaster to all directly or indirectly dependent on the iron and steel business. There is no reason now why the group of men who carry on from 70 to 75 per cent of this business should build a single mill more than the demands of the business warrant, and if we recall the war which was in progress at the time of the formation of this Corporation, the importance of this will be manifest. The manner in which the Corporation is administered, however, is of the first importance. The question here is whether the men who have combined are taking every advantage of the opportunities for effecting the purpose which they profess to have in mind."

New Building-laws for Paris. — John K. Gowdy, United States Consul-General at Paris, in a dispatch to the State Department, reports: "New regulations concerning the erection of buildings in Paris have just been issued by the municipal surveyors, as the decrees hitherto in force (though they dated no farther back than 1882 or 1884) did not satisfy modern requirements in the matters of hygiene, comfort and luxury. The height of buildings is thus fixed: If the road is less than 12 metres (39 feet) wide, the height of the building must not exceed the width of the street by more than 6 metres (19½ feet). On a roadway 12 metres wide, the house may therefore be 18 metres (59 feet) high, and for every additional meter in the breadth of the road, a quarter of a metre (about 10 inches) may be added to the height of the house until the limit of 20 metres (nearly 66 feet) to the eaves is reached; but no building may exceed that. In all dwellings, whether situated on a public or private road or in a courtyard, the height of the ceiling of the ground-floor apartment, and also that of the entresol, shall not be less than 9 feet 2 inches. Projections — bases of columns, balconies, corbels, bow-windows, etc. — are subject to certain general regulations, which may be modified in special cases. Thus, if a roadway is 52 feet or more wide, the regulation width of the balconies may be increased by one-fourth. A new and useful clause in the decree provides that any shutter, blind or sunshade placed not more than 10 feet above the pavement must either be within the body of the wall or must not open outward. There are also minute regulations concerning verandas, awnings, sun-blinds, outside lamps, cornices and signs." — *N. Y. Times.*

Humors of the Custom-house Officers. — There are many artistic jests, not intentional, but all the more amusing, in the decisions of the Treasury Department under the tariff-law, published every Thursday under the title of Treasury Decisions. When the United States General Appraisers at New York are called upon, by some protest against a decision of the Collector of Customs, to ascertain and declare, for instance, whether "a screen made of wood, silk and cotton, the panels of which are ornamented with landscapes and figures painted in oil" is to be considered as "a manufacture of cotton, wood and silk, cotton chief value," or as "a painting in oil or water-colors," it is evident that there is an opportunity for ponderous legal definitions which are not without their comical side. It is certainly amusing, though the importer may not see it, to have a "screen made of wood, silk and cotton, the panels of which are ornamented with landscapes and figures painted in oil," returned for duty as "a manufacture of cotton, wood and silk, cotton chief value." As the invoice value of the screen is $1,200, it is quite surprising to note how valuable the cotton (which, incidentally, has a painting upon it), must be. The force of the point is enhanced by the fact that if the object is "a manufacture of cotton" it must pay a duty of 45 per cent *ad valorem*, whereas if it is only "a painting in oil or water-color" it need pay only 20 per cent *ad valorem*. The decision of Mr. Somerville, General Appraiser, is that the screen is a "painting in oil or water-colors." It is, therefore, dutiable at 20 per cent, and the decision of the Collector is reversed. We approve of the decision, but the legal argument by which it is arrived at excites wonder, awe and amusement. Screens, it seems, are not enumerated *eo nomine* in the present Tariff Act, except in Paragraph 382, which refers only to those which are *ejusdem generis* with "mats, rugs for floors, screens, covers, hassocks, bed-sides, art-squares," which are made wholly or in part of wool, and which are made subject to the same rate of duty as is imposed on carpets or carpeting of like character. The General Appraiser is therefore bound to follow certain rulings of the Circuit Court for the Southern District of New York in parallel cases, which he does, without much enthusiasm, though the equitable and sensible nature of these rulings is self-evident. For example, a certain lot of "fans composed of silk and bone," decorated with paintings in water-colors, were held to be dutiable, not as manufactures of silk, but as paintings. This ruling was made upon the theory that at least two-thirds of the value of the fans was imparted to them by reason of the painting, and not by reason of the material upon which the painting was made. So in the case of a lot of paintings in oil upon panels of papier-maché, designed to go in the frame of a false door, which were held to be dutiable as paintings, and not as manufactures of wood. So also in the case of certain Japanese wall-decorations made of paper, paper and cotton, or of narrow strips of bamboo joined together with cotton cord, having upon them representations of human figures, birds, etc., in water-colors, which were held to be dutiable as paintings, and not according to the component material. The last ruling of the Circuit Court upon an analogous subject is found in White *vs.* United States (113 Fed. Rep., 855). It was there decided that ceilings painted on wood, taken from a palace in Italy, should be classified as paintings, and not as manufactures of wood. "The value of the wood," remarked the sapient judge, "as compared with the paintings, is infinitesimal." It is thus to be observed that while the mental processes through which these conclusions are arrived at seem somewhat more complicated and ponderous than necessary, the decisions are obviously sound, reasonable and just. — *Boston Transcript.*

Thawing Water-pipes by Electricity. — A regular occupation for the electrical force at Sault Ste. Marie is the thawing of frozen water-pipes. The work has been carried on by William Gorby for the last six years, and his work was begun on a hint given by a college professor. He tried it at the first opportunity, and found that the pipe was in service in a few minutes. Since that time he has thawed out all sorts and sizes of water-pipes, at a great saving of money to the owners. The largest thawed out was a 4-inch cast-iron pipe which was frozen more or less for 200 feet. It took half an hour to get the water running through it. A 250-kilowatt transformer is mounted on a sleigh, although nearly all the pipes could be thawed out by a 500-light transformer. The primary wires (2,200 volts) are bared, and the current led through a water rheostat to the transformer. The secondary is connected to the frozen pipe at two places, and the current switched on. In the ordinary house-service pipes, the water begins to flow very quickly, frequently within a minute. Although it may seem dangerous handling the primary current in this way, it is declared that no accidents have happened, and the apparatus has never failed in getting a frozen pipe working. — *N. Y. Evening Post.*

Artificial Island to be built in New York Harbor. — A new island is to be built in New York Harbor, between Ellis Island and Bedlow's Island, for the erection of a hospital for the care of immigrants suffering from contagious disease. This is one of the improvements recommended by Supervising Architect Taylor, who has been at Ellis Island making an investigation of the needs for additional accommodations for the United States Immigrant Station. He has recommended that the main buildings be enlarged at a cost of approximately $300,000; that the existing hospital be enlarged at a cost of about $100,000, and that an island of several acres be built up and a hospital erected on it at a cost of about $250,000. His recommendations have been approved by Assistant Secretary Taylor, and he has been directed to prepare plans and estimates for the work. When this has been done Congress will be asked to make the necessary appropriations. The improvements are made necessary by the rapid increase in the number of immigrants arriving at New York. — *N. Y. Tribune.*

The Manuscript of Ruskin's "Seven Lamps of Architecture." — J. Pierpont Morgan, according to a dispatch from London, has made a most interesting addition to his collection of literary treasures by purchasing for $25,000 the manuscript of John Ruskin's "*The Seven Lamps of Architecture.*" "*The Seven Lamps of Architecture*" was written by Ruskin in the autumn of 1848, soon after his marriage to Miss Euphemia Chalmers Gray, who afterward became the wife of Sir John Millais, P. R. A. Ruskin's brief married life was marked by a period of great literary activity, and a few months after Miss Gray became his wife he felt free to pursue the completion of a task which he had some time before set himself — the writing of a book in which some of the principles he had sought in "*Modern Painters*" to enforce in the case of painting should be applied to architecture. The Seven Lamps were those of sacrifice, truth, power, beauty, life, memory and obedience. It was published on May 10, 1849, and has been the most widely circulated of all Ruskin's larger works. It was the first of them to be illustrated. — *N. Y. Times.*

Brick Foundations. — It was only a few years ago that any one who walked along the street where a good building was being put up saw nothing but stone foundations. This condition has changed. Builders used to think that a man who had a brick house with a stone foundation and slate roof had reached the acme of excellence. As it is now, stone foundations are rarely known. The old stonemason is now practically out of a job. And for what reason, may we ask? Merely because of the excellence of brick. A better foundation, one more solid, one cheaper, one more satisfactory, one straighter and altogether better can be built from brick than from stone. It is one of the changes that have been made within recent years because of the high character of brick. Stone may be used for facing for alleged artistic reasons, but it is backed up by brick, and below the facings we find brick. This was slow in coming, but at this time the best buildings of all classes are provided with foundations not of stone, but of brick, and for the reason that brick is the better material. — *The Clay Worker.*

The Ashes of Columbus now in Seville Cathedral. — The ceremony of depositing the ashes of Christopher Columbus in a special mausoleum was carried out in the Cathedral last month with befitting solemnity. The coffin was borne on the shoulders of a party of naval seamen and behind it walked in procession the Archbishop of Seville, the Cathedral Chapter, the Minister of Marine and a number of other dignitaries. — *Boston Herald.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, DECEMBER 13, 1902 No. 1407

CONTENTS

SUMMARY: —

The Schenectady Trade-unions and the Expelled Militiaman. —Reinstatement of Expelled Union Men by the Courts.—Incorporation of Trade-Unions. — The Utility of Stand-pipes in High Buildings. — Roof-coverings, picturesque or otherwise, and their Defects. —Award of the Lazarus Scholarship for Mural Painters. 81

BRONZE DOORS IN ITALY. 83

THE RELATION OF NATURAL TO ARTIFICIAL BEAUTY IN LANDSCAPE 84

SOCIETIES 87

ILLUSTRATIONS: —

Two Houses on Peter Parley Road, Jamaica Plain, Mass. — The Faulkner Hospital, Boston, Mass. — Detail of Administration Building: Faulkner Hospital, West Roxbury, Mass. — Presbyterian Church, Craigsville, Va.

Additional: "The Technology Chambers," Boston, Mass. — Institution for Savings in Roxbury and its Vicinity, Boston, Mass. — Italian Bronze Doors: Four Plates. 87

NOTES AND CLIPPINGS. 87

THE case of the painter in New York State who was expelled from the painters' union because he had belonged to the State militia has excited much interest throughout the country. It seems that the painter, William Potter, after his expulsion from the union, wrote to every master-painter in the town in which he lived, asking for employment, and received letters from all, refusing it, on the ground that they could not employ non-union men, some of them expressing their regret that they were unable to do so. In consequence of this, Potter applied to the courts, alleging that neither the union nor any of its members had any property out of which damages could be collected, and praying that an order might be issued, commanding the union to reinstate him. It is pleasant to learn that an order to this effect was promptly made, and, unless the union restores him to his standing, all its members are liable to punishment for contempt of court.

THERE is no need of dwelling on the un-American tyranny and degradation of a system by which a gang of confessed paupers can rule absolutely an honorable profession in a community of considerable importance, as all this has long been familiar to everybody; but the point in which this case differs from any other is that the courts have, apparently for the first time, issued to a union a definite command, and thereby put unionism generally in a position of great perplexity. It is obvious that if the members of unions can, by command of courts, be compelled, not only to desist from oppression, but to do acts of justice, they become like ordinary citizens, and the absolute and irresponsible power, practically of life and death, with which they have kept their victims in terror, disappears. It is needless to say that if a man expelled from a union on account of belonging to the militia can be reinstated by the public force which carries out the decrees of courts, the men who have been deprived of their living in the same way on account of being too old, or not having been born in Belgium, or being too ambitious and industrious, or not drinking enough beer at a certain saloon, or having incurred in some way the ill-will of an influential "champion of labor," will soon be besieging the courts for justice, and the tyrants who by starvation and murder have established their authority over the best class of citizens that we have in this country will at last find a curb put upon their energies. The "labor champions" understand all this perfectly, and it is certain that every possible effort will be made to evade the direct conflict of authority between the courts and the unions which the Potter case has raised, either by getting Potter quietly away to some other place, and finding him satisfactory employment, on condition of his letting the case drop; or by raising some different issue, which will save the union the humiliation of submission to the constituted authority in the vital matter of the admission of a member to their ranks. What the result will be in the present instance no one can tell, but the issue, having been once raised, is sure to make its appearance again.

WHAT it would be a great advantage, in the end, for the unions to be subjected, like other associations of citizens, to the control of the courts is unquestionable. Nothing has done more harm to the union workingmen of this country than the feeling of great and irresponsible power over other people, which could be exercised arbitrarily or maliciously, and practically without restraint, so long as the members of the unions were careful not to save up money for their families, which might be held liable for damages. Although the general sense of honesty and decency, which is very strong among those who work hard, has kept them at ordinary times within reasonable bounds, the excitement of strikes has led even the better class of union men to unjustifiable measures, and the impunity which these have found, joined with the steadily degrading influence of the premium placed by union methods on improvidence, have cultivated in the union members a contempt for law, and for the rights of other people, and an indifference to the duties and responsibilities of citizenship, which are particularly dangerous in a democracy like ours, which is largely ruled, and has hitherto been well ruled, by workingmen. The compulsory incorporation of unions, by restoring the liability of corporate property for the debts or misdemeanors of the union, as well as by freeing the individual property of the members from such liability, would do very much to encourage workingmen again to make provision for old age or misfortune, as well as to feel themselves again sharing all the duties and responsibilities of citizens; and the recognition of the authority of the courts over them would complete the assimilation of workingmen to the rest of the community which has made our country what it is. That those who have found profit for themselves in separating workingmen into a class apart should dread their incorporation again into the great body of American citizenship is to be expected; but the tendency toward such a change in the position of working people is clear, and there are many indications that the abolition of the barriers between the so-called "classes" which theorists and demogogues have for so many years been trying to establish will be followed by a mutual respect and regard which has never been known before, even in this country. There has never been a time when so little of the pride of family, one of the most hard-hearted varieties of that sin, existed here, it having been all but swept away by the flood of new wealth which has overwhelmed it; and, although there is such a thing as the pride of wealth, it rests on so insecure a basis as not to be very dangerous; while, as a matter of fact, nearly all our very rich men have themselves been workingmen, and are not only proud of the fact, but use their knowledge of the needs of workingmen, and their sympathy with them, in a way which signifies more for the future of the Republic than most people imagine. When we reflect that it is not much more than a hundred years since Marie Antoinette, if we may believe the legend, when she heard that multitudes of her subjects were without bread, wondered why they did not eat cake, and then observe Mr. Andrew Carnegie devoting enormous sums to providing, with anxious and wise care, those advantages for the poor boys and girls of the future of which he felt the need when he was himself a poor boy; or Mr. Charles M. Schwab, brightening the existence of the thousands of people who work under his direction by his unfailing interest and kindness; or the Bishop of New York, to whose impartial sympathy employers and employed resort with equal confidence; or the Tenement House Commission, through which the very poor have been brought nearer to their more fortunate fellows than ever before; or the thousand and one ways in which poor people are made to feel the personal interest and consideration of richer ones, the devices of designing politicians and demagogues to set the poor against the rich, and to keep them poor that they may do so more effectually, seem horrible anachronisms, which must, sooner or later, be swept away, and which every American who loves his country and his countrymen should help to sweep away as quickly and effectually as possible.

THE recent successful tests in New York of the practicability of sending a stream of water from a fire-engine into the upper stories of the new "Flatiron Building," which is about three hundred feet high, have revived the public interest

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.
Entered at the Post-Office at Boston as second-class matter

in the stand-pipe system, which alone makes such a feat possible. It is not long since some distinguished fire-engineer announced that everything above the twelfth or fifteenth story in a modern office-building was beyond the reach of any appliances at the command of fire-departments. It is evident that ordinary hose would not resist the pressure necessary to lift a stream of water to a height of three hundred feet; but there is no difficulty in fitting a building with permanent wrought-iron pipes, tested at a thousand pounds' pressure to the square inch, and so arranged that water can be pumped by fire-engines directly into them, and so conducted to any height. Years ago, when seven stories was the usual limit of height in mercantile buildings, it was a common practice to place on the street front of such buildings one or more vertical wrought-iron pipes, with a single or double coupling near the sidewalk, for making connection with a steam fire-engine, and an outlet in every story above, to which a hose could be attached in case of need. All the connections were closed with brass caps, attached to a chain, so that they could not be lost, but easily removable in time of fire. The same system has now been revived for the protection of high buildings, and might, with advantage, be required in all structures used for storage, manufacturing, mercantile or office purposes. For a lofty building the lower coupling should always be double, so that the power of two engines can be united to force water through the pipe; and it is now common to place the pipe either outside the building, or, more usually, just inside the wall, where it is safer from freezing, but near a line of windows, so that firemen can reach it from the outside, with ladders. In the case of a three-hundred foot office-building, outside ladders, unless in the form of a permanent fire-escape, would be out of the question, and the position of the stand-pipe for fire use is then determined by accessibility. In either case a good stand-pipe, as the tests at the "Flatiron Building" show, is an invaluable security. Even on the roof of the structure a pressure-gauge showed forty-seven pounds' pressure in the pipe, so that the water could easily have been forced a hundred feet higher still.

A VERY interesting paper was read before the London Agricultural Association a few weeks ago, by Mr. F. C. Eden, on "Roof Coverings," and the discussion which followed the reading brought out with peculiar emphasis the "eternal conflict" between the useful and the beautiful which gives the profession so many anxieties. As Mr. Eden began by quoting Goethe's saying, "Take care of the beautiful, for the useful can take care of itself," experienced architects can imagine what he thought of roof-coverings. His opinion that no roof is either more useful or more beautiful than one of good, hand-made, hard-burnt shingle tiles, not less than half an inch thick, will be shared by most American architects, and many of them will also agree that such tiles should not be selected for uniform color, and that a little warping in the burning is rather an advantage than otherwise; but those who have listened meekly to a client's animadversions on their attempts at picturesqueness are likely to hesitate before adopting, at least as a rule of practice, his opinion that the best ridge for a tile roof is made with plain half-round tiles, with a thick fillet of white mortar over each joint, and a bottle stuck in the end, as a finish over the gable.

SOME of Mr. Eden's other ideas of roof-finish would hardly appeal to the average client. Speaking of lead roofing, he mentions certain old English churches covered with this material, which have no gutter, but in which "the lead hangs easily over the eaves like a flounce, which gives a curiously forlorn look, not without charm." We imagine that an architect who accompanied his church building-committee on a visit of inspection of the "forlorn" effects which he had contrived for their benefit would never forget the occasion. In regard to projecting rafter-ends, also, he would be a bold architect who would venture to follow Mr. Eden's advice, and "space them unequally, and vary their sizes," however convinced he might be personally of the advantages of this arrangement. Within certain bounds, however, these suggestions are valuable. We once had a very considerate and satisfactory client whose instructions were confined mainly to one requirement — that everything about his house should be "square, true, plumb and level"; and the young architect who thirsts for an opportunity to astonish the world by the picturesqueness of his work will do well to ascertain beforehand his client's views on the subject; but having made sure of this point, some of Mr. Eden's observations might be applied with profit. In a tile roof, for example, he advises spacing the rafters far apart, so that the laths, when loaded with the tiles, will sag between them; and although this gives a suggestion of an old horse's ribs which is not quite pleasant, a certain safe sagging unquestionably adds much to the beauty of a roof, throwing the distressing parallel edges of tiles, slates or shingles into varying curves. In repairing the roof of the fifteenth-century house known as Ockwells Manor, Mr. Eden says that the purlins were found to be set at such a level that the rafters did not touch them by about an inch until loaded with the tiles, the effect being to throw the completed roof into gentle undulations, the prominent portions being over the main trusses. This effect must have been intended, and it illustrates curiously the passion for the picturesque which characterized the Middle Ages, and which has been so ably traced, in another field, by Professor Goodyear.

THE remarks made by the audience upon Mr. Eden's paper were about what might have been expected. One architect happened to have a reversionary interest in some real estate in Kent, "where," as he said, "could be found the features dealt with by Mr. Eden," such as oak timbers, hand-made tiles, and so on. The cottages on the property were exceedingly picturesque, and were often sketched or painted by artists, but they had one defect — from the landlord's point of view — that they were uninhabitable. Another hearer, while he agreed with Mr. Eden that rainwater gutters were not always desirable, and that a choked gutter or conductor would often do more harm in a few minutes than dripping eaves would do in as many years, observed that local building regulations always required rainwater gutters, whether they were picturesque or not; and a third "disagreed with almost all Mr. Eden's conclusions," for the very sensible reason that architects had to satisfy their clients in their houses, rather than themselves, and that clients were not likely to appreciate an inordinate picturesqueness, however gratifying it might be to the young artists who did not have to live in the houses. On the whole, however, the members of the audience agreed, as artists, with Mr. Eden, the doubt in their minds being whether architects were justified in imposing their own notions of picturesqueness on their employers.

STUDENTS of art do not know so much as they ought about the prizes open to them in this country. A few days ago the noble Lazarus Scholarship for mural painting, which gives to the winner three years' residence in Europe, with the ample income, for a student, of a thousand dollars a year, was awarded to the author of the best out of only seven competing designs. If artists realized that this great prize is only second in value to the Prize of Rome in the French School of Fine-Arts, and that, in these days of increasing demand for good mural decoration, the winner of such a prize has his whole future practically secure, the competitors should be counted by hundreds, and the competition itself should be one of the great events in the artistic world. Instead of that, in 1896, when the scholarship, which is triennial, was first awarded, there were only three competitors; in 1899 there were six; and this year one more has joined the lists. Although the three winners of the prize, Mr. Breck, in 1896, Mr. Schwartz, in 1899, and Mr. Rylands, this year, have all been pupils of the New York Arts Students' League, the scholarship is not restricted to New Yorkers. On the contrary, the competition is open to all unmarried male citizens of the United States who can pass a satisfactory examination in the history of architecture, free-hand drawing, and elementary French and Italian, and the sketches submitted are judged by the most accomplished experts in the country. American artists are accused, perhaps with some reason, of being too conceited to venture their work in competition with that of others. If there is any truth in this notion, the sooner they change their minds, the better it will be for them. Nothing does so much to clear out of an artist's head the fog raised by the flattery of his friends and the newspaper reporters as to try his strength in competition before a good jury. If he wins, he gains a better idea of his own capacities, as well as of his limitations, than he could get in any other way; and if he loses, he has the inestimable advantage of finding out where his weak points are, and in what ways his competitors surpass him, to say nothing of the increase of power which every man gains by doing the very best of which he is capable, and cannot gain otherwise.

BRONZE DOORS IN ITALY.

UPON every side artistic Italy is worthy of remark and attention; and if from the solemn "monuments" we descend to the complementary and decorative parts of these same monuments, in every one, or almost every one, we shall find objects worthy of study. To-day, I mean to discuss the matter of door-valves in wood and bronze; and even if I limit myself to the chief types, we shall find many models, an acquaintance with which will not be useless. I beg the reader to be assured that the information which I give is not improvised, but is authoritative and exact, particulars in which the writers of to-day are not over-careful.

For the sake of brevity I will not begin with the Greek and Roman epoch, but limit myself to the Paleo-Christian epoch. I call your attention, therefore, to the wooden door-valves, the most ancient of the Christian epoch. These are the doors in the basilica of Sta. Sabina at Rome, the objects of a wide and serious consideration by many writers of many countries. M. Kondakoff, the celebrated historian of Byzantine art, since June, 1877, has concerned himself with these doors, and aims at showing the high value of the opinion expressed by De Rossi, the prince of Christian archæologists, and of Cavalcaselle and Crowe, as well as of Doppert, to the effect that these doors date back to the sixth century, and not to the twelfth or thirteenth century, as has been supposed. Our author proves the earnestness of his opinion by a comparison with similar monuments, especially with the sarcophagi and ivory diptychs of the fourth, fifth and sixth centuries. Lately, a writer of high standing, M. Grisar, published on the same subject a very elaborate essay, which reached almost the same conclusion. This author, who also attempted to fix the exact date of the doors of Sta. Sabina, satisfied himself that they must have been begun about the year 435, the time when the basilica itself was finished, and since these doors exhibit figured panels not all wrought in the same style, M. Grisar, far from admitting that the sculptures are of different dates, tries to prove that several contemporary artists of different degrees of ability carried out the work. The subjects are allied with the iconography of Christian cemetaries: the series is not complete, since ten of the fables have been carried off by some one. These Roman doors deserve attention, too, because, earlier than any other to our knowledge, they exhibit the Crucifixion, and certain writers have seen in these doors the model of the celebrated door by Bernward († 1022) in the Cathedral of Hildesheim; but the resemblance is not really a striking one. The same thing may be said of the resemblance which they have tried to establish between the Roman doors and the chief doorway of the Cathedral of Spalatro, which dates from 1214. It is enough to say, however, that the doors of Sta. Sabina form one of the most important monuments of primitive Christian art.

Italy also boasts another very ancient monument of this class, one less known than the doors already spoken of, namely, the doors for the principal entrance to San Ambrogio, at Milan, which were removed in 1750 because of their ruinous condition; being at that time replaced by modern doors, incorporating certain portions of the originals. I have always considered these fragments as work of the eleventh century; but recently a student of the subject has shown that these sculptures date back to the same time as those of the door of Sta. Sabina. I can hardly give my adhesion to this new opinion emitted by Herr Goldschmidt. But, in any event, we are here in the presence of the remains of wood-carving of really venerable antiquity.

But it is not the wooden doors which in point of antiquity form the most remarkable group on the Peninsula. Italy could hardly be richer in bronze doors of the Byzantine type, and whoever would study this class of monument must, perforce, address himself to Italy. All writers who have given attention to Italian art of the Byzantine period have discussed the influences that this art exercised over the national traditions, some expanding and others restraining them. The truth is that this influence was not exercised with uniformity; a certain provincial admiration for Greek work has been remarkable, and even to-day is very evident. Elsewhere, it was less felt, and disappeared altogether at an early date. Aside from the city of Ravenna, in the North of Italy, the Byzantine influence was powerfully felt in the South, and an important witness to this is the many door-valves to be found in the Southern cities of Italy. This does not prove that there were none of these in the Northern and Central Provinces of the country, and here I mean the carved or engraved work, the most ancient specimens not dating back farther than the second half of the eleventh century. At this time, and in the twelfth century, bronze doors, particularly those executed in Constantinople, had an extraordinary vogue in Italy, but as soon as Italian artists attempted to imitate them the fashion ceased and, side by side with doors unquestionably of Byzantine origin, the Peninsula decorated itself with doors which betrayed their national origin. In this connection, that is to say, on the matter of the influence exercised by Byzantine work upon the authors of our bronze sculptured work, which I shall presently mention, one might write a long dissertation; but this is not the right place, or, at least, not the right time, for entering upon such a discussion. I will, therefore, limit myself to the most important facts, the ones best established.

There will be found amongst the illustrations the bronze door-valves of S. Zeno at Verona, one of the Northern cities of Italy, which fondly cherishes this venerable monument of the eleventh and twelfth centuries. These doors are really older than the time which we are studying, but they have not come down to us in their primitive state; for in the twelfth century they were very materially worked over, and of the ancient parts there only remain the left valve and some of the lower bas-reliefs upon the right valve. The carvings in general are crude, especially those of the eleventh century, but the general decorative effect of the door is particularly remarkable.

Nevertheless, any of my readers who might desire a model of door-valves of the twelfth century should not lose sight of the bronze doors of the cathedral at Benevento, in the south of Italy. The work in question is a monument of exceptional beauty for its time, and its general air and artistic worth connect it directly with the school of art which produced the celebrated doors of Andrea da Pontadera at Pisa, and Lorenzo Ghiberti at Florence, to such a degree as to enable one to affirm that the door at Benevento holds the same place in the art of the twelfth century as is held by the doors of Pontadera and Ghiberti. The door exhibits forty-three scenes from the history of the life of Christ; and this sacred composition is quite unique in the twelfth century. Never at this epoch had sculpture or painting composed so complete a story of the life of Jesus, and unfortunately the author's name is now unknown.

The doors at Benevento are sometimes compared with the two doors at Troia and Ravello, in the south of Italy, but if the details of the sculpture upon these doors remind one of those at Benevento the resemblance of the *ensembles* is less noticeable.

To summarize matters as much as possible: we shall make the acquaintance of a number of monuments, that is to say doors, some decorated with bas-reliefs, others engraved, the images being inlaid with metallic wire. The doors of the latter class are of the greatest antiquity: amongst them we find the doors to the Cathedral of Amalfi (1062), the Abbey of Montecassino (1066), of S. Paul. Outside the Walls of Rome, executed in 1070, at Constantinople, by the sculptor Staurakios; the door of S. Ange "sul Gargano" (1076) in the cathedral at Salerno (1077); the Church of the Saviour at Atrani (1087), and at the Cathedral Troia (two doors) 1119 and 1127; those by Barisano da Crani, in the Cathedral of Ravello (1179); the door at Pisa, executed by Bonanno Pisano, destined for the Cathedral of Monreale (1186), a work later than those by the same artist executed in 1180 for the cathedral of his natal city, which burned down in 1596, and the doors of S. Clement at Casoria (1191); of the Cathedral of Benevento, end of the twelfth century; and of S. John Lateran, at Rome (1196), etc.

As I have already said, in this series of monuments, rich though very incomplete (I give a list of doors later on), the doors have been executed either with images and ornaments incised and filled-in with gold or silver wire, or with bas-reliefs of small dimensions. Sometimes, as in the case of the door to the Boemondo Chapel, at Canosa, the Mussulman influence has the upper hand, and the ornaments are conceived in such a manner that they might properly enrich the doorway of a mosque. This should not excite surprise, as we know that we here deal with a province of Southern Italy dominated by the Normans, who had also conquered Sicily, giving to it a government and eclectic culture: and furthermore, in Sicily, the Normans found an old civilization — the Mussulman and the Greek, Byzantine art and the art of the Arab mixed together, at times one influence getting the upper hand, and at another the other, as in the Cappella Palatina at Palermo, with its ceiling enriched with stalactites, and I might say, as in the door at Canosa, if this had not arrived in Italy from Constantinople. Nevertheless, the fact of having accepted for a Catholic church an ornament of Oriental character is very significant, and the curious contrast is explained in the same manner in Apulia as in Sicily, the Government being the same.

Annexed is a short list of Italian bronze door-valves, naturally limited to the epoch of the Middle Ages, which has left us a great number of these works of art that have come down to us in a generally satisfactory condition. In addition to the name of the structure, I give the year or the epoch, the place of origin and, possibly, the name of the author; and I will add that this list of mine corrects inaccuracies in lists elsewhere published.

DOORS ENGRAVED AND INCISED.

Cathedral of Amalfi	1062	Constantinople.
Abbey de Montecassino	1066	Constantinople.
St. Paul, Extra Muros, Rome	1070	Constantinople.
Monte S. Angelo a Gargano	1076	Constantinople.
Cathedral of Salerno	1077	Constantinople.
S. Salvatore, Atraul	1087	Constantinople.
Chapel of Boemondo at Canosa	End of XI Century,	Ruggero d' Amalfi.
S. Mark's, Venice	1085	Constantinople.
S. Mark's, Venice	1112	Imitation by a Venetian Artist.

DOORS DECORATED WITH BAS-RELIEFS.

S. Zeno, Verona	X-XII	Century partly German work.
Cathedral of Troia	1119	Oderisio Berardo.
Cathedral of Troia	1127	Oderisio Berardo.
S. Bartolomeo, Benevento (destroyed)	1150-1	Oderisio Berardo.
Cathedral of Trani	1160	Barisano di Trani.
Cathedral of Ravello	1179	Barisano di Trani.
Cathedral of Pisa	1180 (?)	Bonanno da Pisa.
Cathedral of Pisa (destroyed)	1180 (?)	Bonanno da Pisa.
Cathedral of Monreale	1186	Bonanno da Pisa.
Cathedral of Monreale	End of XII Century,	Barisano di Trani.
Abbey of S. Clemente, Casoria	XII Century (?).	
Cathedral of Benevento	End XII Century (?).	
S. John Lateran, Rome	1196	Umberto and Pietro da Piacenza.

Now we have some slight knowledge of several of the Italian sculptors of the Middle Ages, three of whom especially interest us: Oderisio Berardo, Barisano di Trani, and Bonanno da Pisa; two

from southern Provinces, the third from Tuscany, that is to say, from one of the central Provinces. The last two named are sufficiently well known. The first, on the other hand, is almost a new name, even in Italy; yet some would, mistakenly, like to attribute to him the most magnificent door of the twelfth century, that in the Cathedral of Benevento; perhaps for the reason that this sculptor was a citizen of that city, for this reason being sometimes styled "Oderisio Beneventano." The fact that he is not the author of the doors at Benevento is demonstrated by a comparison of these door-valves with those of the Cathedral at Troia, which certainly are due to him: having been executed, as we have seen just now, the principal door in 1119, and the secondary door in 1127. I am sorry not to be able to halt longer over this subject; so, apropos of Oderisio Berardo, I will only add that M. Barbier de Montault has imagined that this Berardo (who is not Berardi, as we sometimes find him named) was a Frenchman of the name of Beraud.

Perhaps the door at Benevento was executed by the Greeks, for there is a tradition to this effect; and for my part, I am not unwilling to accept it, merely adding that it was quite possible that it should have reached Italy from Constantinople. Now, let us leave, for the present, the Mediæval epoch, and at the very opening of the Renaissance we shall find a door of admirable beauty, one of the most exquisite ornaments of the Italy of the fourteenth century, the work of Andrea da Pontadera, falsely styled da Pisa, he being really a citizen of Pontadera, one of the suburbs of Pisa.

Andrea da Pontadera influenced the artistic spirit and thought of his time in an exceptional manner. Born in 1270, he died at Florence in 1348; and during this long lifetime of seventy-eight years, we know with certainty of only a single work of his, the door with which we are now dealing. This is found in one of the secondary entrances of the Baptistery at Florence, and Vasari, who stated a great many facts which are not facts at all about our Tuscan artists, commits an error in refusing to credit him with the sole paternity of the Florentine door; but Vasari, as already has been remarked, would not deserve serious consideration if his statement had not been accepted by the eminent authorities Crowe and Cavalcasselle in the following words: "The chief work of Andrea," they say on page 3 of Volume II, "is certainly the bronze door of the Baptistery of Florence, in which, to the excellence of the composition and distribution due to Giotto, he knew how to add, with equal skill, a simplicity of expression, which admirably renders the chief idea of the subject chosen for treatment." This opinion cannot be for a moment sustained in face of the work. Andrea's gracious and tender style has no likeness with the profound, forceful gravity of Giotto's work. Moreover, Andrea began his work on the Baptistery door in 1330, when he was sixty years old, and no one can believe that an artist of his stamp, a real leader of his school, as he was, could accept a divided commission: a master of his stamp could not have been so humiliated. Well composed, as the door as a whole certainly is, it deserves examination more because of the many bas-reliefs, which divide it into twenty-eight panels; twenty of which are devoted to the life of St. John, and eight to the illustration of the virtues. The beauty of these images, the serenity and simplicity of the composition, make of Andrea's door a monument of extreme interest, a marvellous source of æsthetic pleasure. After examining this door, one understands the incomparable power of the two other doors of the Baptistery, the work of Lorenzo Ghiberti.

In Italy one cannot speak of bronze doors without having his thoughts turned to those doors which Ghiberti sculptured for two of the entrances to the Baptistery at Florence. The Baptistery has three doors, and every one remembers the competition which was held for the first door, which brought face to face several of the leading sculptors of Italy, artists as celebrated as Jacopo della Quercia, and Filippo Brunelleschi, the great architect. At the last moment the struggle lay between Ghiberti and Brunelleschi, who each executed a bas-relief which is still preserved in the National Museum at Florence; and everybody now knows that in 1403 Ghiberti received the commission for executing the door, which, still in a good state of preservation, commands our admiration, at the Baptistery. The composition of this door greatly resembles the door-valves by Andrea da Pontadera, so much so that they might be confounded, a fact which indicates how much the spirit of Andrea's genius influenced such a master as Ghiberti, whose second door Michael Angelo proclaimed worthy to be the doorway to Paradise.

The valves of this door date back to 1425, and in them Ghiberti abandoned the distribution of parts adopted by Andrea, and felt that it was fair for him to enter his bas-reliefs into direct competition with the painting of his times. He made paintings, as it were, out of his sculpture, surrounding each scene with an architectural or landscape background, richly staged. These doors were richly gilded, and here and there are still to be seen bits of the original gilding, but the present coloration of the doors is, to-day, that of bronze.

A matter discussed in these last years is the cause which might have destroyed the ancient gilding, and a very conscientious student declares that in modern times the doors were given a coat of paint. This statement, denied at first, has at length been admitted; for documents have been found which confirm the story that the doors of the Florentine Baptistery did receive a coating of bronze-colored paint: so we should be grateful to those who have made moulds of these doors, that we are, to-day, able to see traces of gold on Ghiberti's work, for the material used in making the moulds tore away the bronze paint, but left the gilding. This may appear doubtful to the reader, but I have the documents which support my statement.

Ghiberti's second door exerted a very marked influence throughout Italy, and the monumental bronze door of the basilica of St. Peter's at Rome, ordered by Pope Eugenius IV, from the Florentine architect and sculptor Pietro Averulino, called "Il Filarete" (died 1465 ?), follows the theme of Ghiberti's second door; so, too, does the little bronze door — a very pretty bit of sculpture — with which Jacopo Sansovino, about 1540, decorated the entrance to the sacristy of St. Mark's at Venice. As for the door at Rome, it is in merit far beneath what one might expect, when account is taken of the fact that it was intended for the noblest temple of the Christian religion. Life and character are lacking in these valves upon which Averulino had several collaborators, but amongst whom certainly was not Simone di Giovanni Ghini, as stated by Vasari.

I am sorry not to describe for the reader, at length, the door of the Castle Nuovo at Naples — very remarkable from the historic point-of-view — bronzework dating from 1462-68, and the doors of the north sacristy of the Cathedral of Florence, executed by Luca della Robbia, between 1447 and 1474, and originally ordered in 1437 from Donatello; and I much regret it, for the latter work is of the first class, sometimes forgotten, for the reason that Luca della Robbia's fame rests on his enamelled terra-cotta work. During his career Donatello did model the bronze doors of the sacristy of San Lorenzo in Florence, but the work adds nothing to the renown of this great master of the fifteenth century.

If we turn to the illustrations, particularly to the wooden doors at Lucca, Monteoliveto Maggiore, in the province of Siena, Parma and Pistoja, desire seizes me to discourse upon Italian Renaissance wood-carving, especially in that exquisite Tuscany, where bloomed the genius of Ghiberti, Donatello and Michael Angelo; for it is Tuscany, the home of so many admired sculptors, that produced a quantity of carved wooden doors, which decorated our monuments, even in the Middle Ages, as, for instance, the door-valves which adorn the Cathedral at Lucca, and the Baptistery at Pistoja. And since we have many works from this company of wood-carvers, a large part of whom were also architects, or sculptors, or painters, attaining sometimes the highest excellence with their works, we have a sufficient explanation for finding amongst these carved doors veritable *chefs d'œuvre* of composition. A certain architectural frigidity characterizes this class of doors, and the use of caissons, which is very often repeated in the ceilings of the halls and rooms in the time of the Renaissance, gives a rather monotonous aspect to our fifteenth and sixteenth century doors, which, nevertheless, in the course of the last half of the latter century, to some degree abandoned the rigid formula which I mention, and are enriched with *motifs* which Classicism would not admit.

As a sample of the transition between the Renaissance and the work of the Baroco period, we have the bronze doors at the main entrance to the Cathedral of Pisa. Here we perceive an effort of fancy which aims at an independence wholly unknown to the artists of the "high Renaissance," as my friend E. Muntz would say. The storied doors are generally attributed to John of Bologna or "Giambologna," the dean of the craft, to whom Italy owes a quantity of fountains. This master sculptor, born at Douai, France, 1524, and who died in Florence in 1681, must have received the order for these door-valves, and also for those which closed the two side doorways of the cathedral; but, although after rather indefinite data, the ascription of the work to Giambologna has been agreed to by most writers, recent investigations have shown that the actual part which the Flemish master had in these doors is really very modest, and might practically be left out of consideration. These doors were modelled by several artists of the school of Giambologna; such as Giovanni Caccini, Pietro Francavilla, Gaspare Mola, Angelo Serani, Pietro Tacca, etc. Moreover, the architectural design cannot be credited to the master, but should be attributed to Raffaello Pagni. This makes it apparent that an important series of sculptures at the end of the sixteenth century (the doors at Pisa were begun in 1596, and the master founder, Domenico Portigiani, who did almost all the founding during that period, died in 1602) were carried out by a group of sculptors most of whom had been almost wholly lost sight of.

A. Melani.

THE RELATION OF NATURAL TO ARTIFICIAL BEAUTY IN LANDSCAPE.

It chanced seven years ago, when we had to chronicle the untimely and particularly pathetic death of John Stewardson, that we had just noticed in *Lippincott's Magazine* the last piece of writing he had time to complete: a forecast of American architecture, and this we obtained permission to lay before our readers a few weeks later.

In the same way it happened that on the day we learned of the equally regrettable death of John Stewardson's friend and partner, Walter Cope, the mail brought us the report of the Fairmount Park Art Association, which contained the following lecture delivered before the Association recently, in all probability the last piece of writing by Mr. Cope: —

In announcing the subject for discussion this evening I feel that I owe you an apology for using such a broad, comprehensive title. Certainly, I do not intend to inflict on you a comprehensive discussion of the subject. It is too broad and touches too many details for me to attempt anything like a thorough treatment in one evening. "The Relation of Natural to Artificial Beauty in Landscape" is, in fact, a subject on which volumes might be written.

And first, as to the word "landscape," — I intended to use it in its widest sense as applying to any scene, whether that scene contain any element of man's handiwork or not. At the present time the subject of "landscape-gardening," "landscape-design," "landscape-architecture," or whatever it may be called, is receiving a great deal of attention, but in speaking of artificial interference with Nature, I should like to abolish the word "landscape" and use, instead, the words "out-door design," reserving "landscape" for that broader meaning which would cover every scene, whether natural, artificial or partaking more or less of both, anything, in short, which the eye may meet under the open sky.

At this age we are in the midst of great structural and engineering undertakings to meet the practical needs of our present civilization, with little thought as to their artistic expression. But times will change and the practical developments of applied science will some day give way to more definite efforts to make the face of the earth more beautiful. It may be a question only of a generation or two when the imagination of the multitude may cease to be moved, as it, undoubtedly, is to-day, by the great developments in transportation, the building of huge buildings and swift steamships, and by the constant improvements in electrical propulsion and communication. And when we shall have solved all these questions of applied science and are content with our achievements in that direction, we may turn our efforts to still greater achievements in an artistic way. To-day, those in whom the artistic sense is dominant are in the minority and this has always been so and probably always will be. But to-day differs from past ages in this fact, that the great majority of people in this age do not really care for artistic expression, do not care as much for the beautiful as they do for what we commonly call "the practical." To-day the artist occupies a relation to the great mass of humanity almost analogous to that which the mediæval alchemist or scientist held in the day when it was the artist who counted, and who captured the applause of the multitude. It is true that the support of the multitude is constantly increasing, but as yet this support has not swept everything before it, and a utilitarian and purely practical tendency is still dominant. The artist of to-day is not in need of better criticism. He has as good criticism as any age has produced, but he is in need of a greater amount of criticism and of the backing of the majority of the people, the criticism of the masses which finally, if not immediately, condemns the inartistic and upholds that which is sound and true in art.

Whatever scene our eyes may light upon, whatever landscape we may contemplate, there can be only two factors — two agencies — which determine its effect upon our minds, upon our sense of the beautiful — Nature and Man. Nature, of course, is a very wide term, but we know what we mean. It is the supreme, the eternal, the ever-present factor. We cannot escape from it entirely if we would, for even man in his works is governed by Nature's own laws. No one of them can he undo or abrogate. The primary laws of physics must govern everything which he builds, and the artistic expression of his building must reflect an acknowledgment of natural laws. But in distinguishing between these two agents, I mean to refer to Nature as that which she does without the aid of man; what she would have done had man never lived upon the face of the earth. On the other hand, in many scenes and many things which we love to look upon there is predominant the other agency, and our delight in its contemplation at times transcends even that which we feel in looking upon Nature; the thought that this stone has been hewn and set, this building has been reared, this path has been cut, these trees have been planted by *man* and to satisfy man's needs and ideals. Perhaps no two of us could agree upon the intensity of pleasure derived from the contemplation of a great cathedral, on the one hand, or the majesty of a rock-ribbed mountain, or the boundless sea, upon the other, nor is it worth while that we should agree. To some of us Nature appeals more than art, though I believe that to most of us each appeals with almost equal force, according to our varying moods.

It follows, then, that if we are to arrive at the true sources of artistic enjoyment we must cultivate and love and study first of all *Nature* and after that man's history, man's ideals, all, in fact, that has led him to express his wants, his aspirations, in physical form. This last is nothing more nor less than the study of architecture in its broadest sense. For all that man builds with an eye to use and beauty is architecture in the sense that it is governed by one system of principles and laws. From time immemorial man has built houses and temples and bridges, has hewn roads and laid out gardens and wrought whatever pleased him upon the face of the earth to satisfy his needs, material and spiritual. And from time immemorial it has pleased him, and it pleases us to-day, and will always please our descendants, to follow certain methods, certain principles of dimension, direction and proportion in that which we lay out and build. These methods are, no doubt, deduced primarily from our innate sense of natural laws. But it is scarcely necessary to go into the source of them. Suffice it to say that it is an indisputable truth that man prefers to set stones level, to build walls straight, or, at least, symmetrically curving, to make level places on which to stand or walk, whether they be floors beneath a roof or terraces under the open sky. His sense of mastery over Nature is expressed in doing things not as Nature would do them. Nature upheaves and splits and tumbles down her rocks. Man hews them into blocks and sets them level and true and rears them into walls. So it always has been — so it ever will be.

In every landscape, then, these two elements must remain distinct. We cannot absolutely unite them nor deceive ourselves into thinking that we can. We cannot modify to any extent worthy of consideration the process of natural growth, or at least such modification can be but temporary. Nature is absolutely continuous and persistent. We must then regard ourselves only as intruders — invaders. It is true that we can interfere with Nature, but it is my purpose to point out that it is not as interferers that we should regard ourselves. As invaders we may, for we could not avoid the position if we would, unless, indeed, we return to absolute savagery.

About the middle of the century just passed, there grew up a school of landscape-gardening, so-called, which was, perhaps, a natural reaction against the extreme and lifeless formalism into which architecture had descended. This school made a complete revolution in the principles which had always before that time governed all artificial interference with the face of Nature. It did not propose to do merely what man had always been pleased to do in the way of laying-out and building and planting, but instead proposed rather to imitate and follow Nature on the lines which she has always reserved to herself. This school still has its disciples, and the results of its work are all about us and have caused, to my mind, a most deplorable subversion of the laws and the principles upon which beauty in landscape must depend. Nature is entirely able to do without the aid of man, and it is equally true that it is impossible for man to imitate Nature without making himself and his work more or less ridiculous. When he attempts it, he must cast to the winds all the methods, all the principles which he has developed in centuries past, and he must play at his game as a child would play at horse. But every once in a while he has to leave his play to attend to the serious matters of life, to build a house or a flight of steps, and these he has to do on the same good old lines that have always prevailed in architecture. He may build his silly little rockeries in would-be imitation of Nature and cut his meaningless winding walks, but he cannot cease to build civilized buildings, he cannot be content to live in caves or rude, shapeless huts.

The moral of all this is, let Nature alone, except where, to satisfy your own practical needs, to satisfy your own ideals of the beautiful, you invade her sacred domain with works that are frankly and freely designed upon lines not imitative or in competition with her, but rather on lines which have commended themselves to man as necessary, reasonable and beautiful from his own particular point-of-view, lines which embody all which he has ever developed as an expression of his own mastery over the earth.

Can we, then, intrude upon Nature in anywise without destroying its charm? Decidedly we can. We may invade Nature with our works and find the result all the more charming; and, in the same manner, Nature may, and does, invade our works only to increase their charm. But the source and reason of our invasion must announce itself frankly. We must feel that this space through the forest has been cleared and levelled in order to meet some human need, that it reminds us of the existence of man and enforces the *human* element, and so serves as a foil or contrast to Nature's work. To look at the other side, what can be more beautiful than the work of man overgrown by Nature — the ruined abbey wrapped in ivy, or the old Italian garden, where the balustrades are half smothered in vines and the vistas down the long paths and terraces are framed between giant cypresses, growing without restraint, long after the builders of those stately balustrades and fountains are forgotten!

Nature, in her own wildness and ruggedness and majesty, we cannot rival, and she, on her side, makes no attempt to rival us. The majesty and beauty of the lonely mountain-side we cannot create, but we may invade it without destroying its charm. Nay, more, we may introduce the human element in a way only to heighten and increase that charm, and it is just where those two elements meet, each in its purity, its frankness, its directness, that we often find the very highest and keenest sense of the beautiful. Can anything be compared in beauty with the views from out the terraced gardens of the Italian lakes, across the deep, smooth surface of the water to the great mass of the Alps beyond? Is a flower ever more beautiful than where it has grown in the crevices of a mouldering ruin? And which is most desolate — the city street, devoid of one touch of natural growth, whether of leaf or flower, or the unbroken expanse of a trackless plain? We have our moods when each of these may please us and Nature has every advantage both in majesty and beauty, but it remains that man is a social being, and, as a rule, he loves to be reminded of the existence of his fellow-man both past and present. He will never resent the evidences of that existence if they occupy a reasonable and proper place.

To come, then, to details: Where and how may we invade Nature? First, we *must* build our houses, our cities, we must bridge our rivers and ravines, we must lay out our roads, even our railroads, and we must go even farther. We must, if we are to satisfy our sense of eternal fitness, make our terraces and gardens where, while asserting our dominance, we can hand over a larger share to Nature's decoration of trees and flowers. Nay, we can even take these trees and flowers and arrange them in formal lines, as we might build a wall, according to our own ideals of what man should do. Nature would never do so of her own accord. An avenue of trees planted at regular intervals, or a trimmed hedge, is as much and as confessedly artificial as the road which they skirt. The box-borders of a garden are, in a sense, as architectural as a stone balustrade. They are simply the works of man in a living medium instead of in a dead one. It is merely a question of how much we shall do of this sort of work, how much is appropriate in a given place to emphasize

this mastery of man over Nature. Manifestly, it must depend upon the dominance with which we wish to assert, the extent to which we wish to remind ourselves of, the human element. A planted avenue has no place in the midst of an uninhabitable plain. It belongs as part of a house, some human arrangement made for man's use and delight. But in proportion as we separate ourselves from centres of human life should we restrain ourselves in making artificial arrangements of planting. A garden is nothing but a great out-door room, a house, so to speak, under the open sky, in which the levels, the width of the paths, should be determined by the same principles of design as we would apply within our houses in the arrangement of our rooms, but whose decoration and coloring, so to speak, are turned over to Nature. And a park made for the use of the multitudes of the city will, in the same way, find its greatest beauty in allowing man's work and Nature's to follow each along its own lines. Why is an avenue of great trees more majestic than an equal number of trees equally spaced, but artificially dotted at random over a given area? The avenue in its arrangement, in its spacing, is *man's* way of arranging trees. It is like a peristyle of great columns; but an equal number of trees equally spaced and yet at random is neither man's way nor Nature's. It expresses neither one thing nor the other, either to the lover of art or to the lover of Nature. Nature does not plant her trees like a crop of corn at suitable intervals and of equal age and size, and it is only where there has been an unsympathetic and unnatural and Philistine interference on the part of man, whether in planting or in cutting down, that we find trees grouped aimlessly, but at equal intervals.

Nature does not build river-walls or bridges or roads any more than she does houses, much less does she make railroad cuts or embankments. What, then, should be our rule in dealing with these? The cuts and embankments for railroads our landscape-gardeners have, fortunately, generally given up in despair. Surely, if not discouraged, Nature will take better care of these than man can possibly do. She will gradually shroud them in trees and thickets and hide the ugly bare gashes that the hand of the engineer has made. Our Wissahickon drive is a beautiful example of this. Did it ever occur to you how frightful, how hideous the Wissahickon must have been when that drive was made — the rocks tumbled down into the stream in great masses? Left alone, Nature has made it utterly beautiful. But what of our river-walls and bridges? Do you think to make these beautiful by building them carelessly, roughly, on lines that are not true and perfect and beautiful architecturally and at the same time cut off all chance for Nature to hide their naked ugliness? Or should they be built as we would build any work which we are pleased to call a true work of art, a true masterpiece of architecture? Shall they be carefully designed and laid out on perfect curves as we would a great building? Certainly, — why not? And the only limit in the matter of costliness and perfection of finish should be the predominance which we wish to give at a given place to the human over the natural element. The well-hewn and graded slopes and levels and bridges of a great mountain-pass may rightly be treated as merely utilitarian, laid out on the lines of the most utter reasonableness, the best engineering, — just, for instance, as the Wissahickon drive, — without undue expense of finish or perfection of curve. Nature will take care of them if she is left to herself, and as time goes on the ravage of man's hand will be lovingly hidden by moss and leaf, and there will be nothing to mar our sense of the reasonable and beautiful. But in a great city or its park or within the well-kept precincts of a country place close to the house, where man must be constantly reminded of his own existence, where people congregate, there it is appropriate that the greatest architectural perfection, the most careful study of design, should be given to every artificial work. We are so trained to think that what we build in the shape of a house must be carefully studied by men who have given their lives to the subject, whose life-work it is to design, that in this last century we have forgotten that all building, all artifical interference with the face of Nature, as I said before, is a part of the same thing, — is only the visible expression, — the physical expression of man on the face of the earth. And the same principles of design that determine the proportions of a façade, — whether an arch shall be a little higher or a little wider, — those same principles govern the dimensions that we would spread out on the face of the ground. A flight of steps out under the open sky is just as much a matter of nice design and proportion as a façade of a building. We are not used to thinking so, especially here in this part of the world, but I believe we are coming to it, and every one did think so before the beginning of the century just past. All out-door design was considered as only a part of architecture, and the same nicety and skill applied to it as in the building of houses. The idea is not only unfamiliar to us of the present day, but it is one I have myself found very hard to put into practice. We have all of us grown up in an atmosphere of believing that the work a man does with pick and spade is an entirely different thing from what he does with hammer and saw; but it should not have been so considered.

But let Nature, so far as she will, clothe this work of ours — whether it be simple or elaborate — in her own way, and still the effect will be more and more beautiful: The two elements will stand in stronger and stronger contrast to each other, not in discord, but in utter harmony and agreement. I by no means urge elaboration or overmuch ornament in that which we do. In this we should be governed by the same rules of good taste and restraint that should characterize every architectural work.

In this country we have been so affected by the school of landscape-gardening, to which I have referred, that we are afraid of the doctrine of formalism. The American of to-day, when he sets about improving the landscape, is very apt to think that he should confine his formal work to buildings, and, after that, pitch into Nature with spade and axe and pruning-hook and impress upon her the fact of his existence by thinning out trees in one place, spotting young trees aimlessly about in others, laying out meaningless and meandering roads and paths and building rustic bridges and what not, with the idea that he is showing his sense of harmony with Nature. If he builds walls or outlying works in stone he feels called upon to give them what he terms a rustic appearance. He fits their tops with jagged pieces of stone, paying but minor heed to lines and levels and to the question whether any wall is needed or not. Now, there never was a piece of stone-work that suffered from being too well and decently laid, and there never was a path that looked the better for curving to a given spot when the curve was due to no natural obstacle and did nothing to make the grade easier. And when we come to the cutting and planting of trees as practised, perhaps more particularly in this neighborhood than any other place that I know of in the world, I can scarcely restrain a feeling of bitterness. What other part of the world has been more richly endowed by Nature with noble native trees than ours, or what more beautiful forest undergrowth can we find than that which springs naturally where it is allowed in the woods of Pennsylvania? Why should we insist on discarding our native growth in favor of trees which are not at home in our country-side and never will be? The pointed spruce, which belongs among the rocks and precipices of the mountains or the rocky coasts of New England, has no sympathy with our softly rounded hills — its aggressive, pointed form needs the contrast of huge rocks and cliffs to harmonize with any open landscape. Can the poor, insipid maple (that is perhaps a little hard) compare in beauty with our sturdy native oaks and chestnuts and sassafras? And as to undergrowth, — why do we insist on cutting off the supply which Nature is always providing of young trees that will, in time, take the place of the taller ones as they die? And why, too, in cutting down our thickets, do we deprive the birds of their nesting-places and the ground of its natural store of moisture, so necessary to the health of trees? There is a good old word in our language which is becoming obsolete in this part of the world, and the fact bespeaks our lack of appreciation of what Nature will do for us if we let her. It is the word "copse," or "coppice," — that natural tangle of trees, little or big, with broken outlines against the sky, a mere fragment of woodland, perhaps, but in itself offering a thousand beautiful studies in rounded or broken outline of twig and foliage. Where can we find more lovely masses of broken skyline, of color, light and shade and blossom than along our untouched hedge-rows? What has the nurseryman given us to take the place of these where they have been destroyed?

If, then, we are to invade our woods, let it be only with wood-paths, and let these be as modest as may be where few travel over them; and where the multitudes must needs enjoy the woods, let good, wide, decently levelled and decently kept paths be run. If it is distressing to see a rough railroad-cut or an embankment in the midst of beautiful mountain-scenery, it is equally so to see a wood overrun by people. I know of nothing more unpleasant than a picnic-grove. There is in it only the feeling of desecration. Where people, then, must congregate beneath the shade of trees, let broad walks be provided in a decent and formal way, a way to acknowledge man's self-respect and, at the same time, his reverence for Nature, and let those parts of the woods not open for such walks be kept sacred, if possible, from human footprint or touch.

If trees must be planted (I except avenues), plant them as Nature would, not at "suitable" distances and each one just as big as the nursery will afford, but sow them hit or miss as Nature does and close together or far apart as chance may place them, and not all of a size. For, if you are to grow a wood or a grove, you must leave to Nature to determine which young tree shall outstrip its neighbors. If you cannot persuade yourself that this will produce a beautiful effect, go into any wild natural wood and see how the roots of even the finest trees are interlocked and their trunks almost united in places. It is by this very overcrowding that Nature produces her most beautiful effects of light and shadow, of contrast; it is the first cause of all picturesqueness in bough and foliage. *Luxuriance* of natural growth should be our aim.

On the barbarous practice of lopping trees I need scarcely comment, but let me make another protest. Having planted flowering shrubs, why should we trim them into rounded balls every winter and thereby cut off most of the bloom-bearing wood? In their proper places the trimming of hedges and box-borders and yews into stiff architectural shapes is one thing, but to trim shrubs, which are beautiful because they bear long, feathery sprays of flowers, has no excuse. It is generally from last year's wood that the flower-bearing shoots spring, and to cut these off each winter means little bloom in the following spring or summer. We need waking up in some of these things. All about Philadelphia this is the practice among the gardeners. People who believe that they have beautiful places and have set out plants to grow allow their gardeners to sweep over them every spring and trim these feathery shrubs into round buttons; it is senseless, aimless, ugly, unheard of! I do not know where it came from, but it certainly prevails in the districts around Philadelphia. If flowering shrubs *must* be cut down, well and good, but take them down entirely, just as you pick out a fern from the midst of a group without marring the beauty of the rest. Trimming

a flowering shrub is as absurd as trimming a maiden-hair fern with a pair of shears.

To sum up: I would urge simply that we take Nature more thoroughly as we find her and as she would be if we let her alone, that we treat her with more respect and allow her free sway where we acknowledge her right to exist at all, and that in all we do of artificial work, whether it be to build houses, to level and open roads, to lay-out walks and gardens, we do all with an eye to the eternal fitness of things, not hoping to improve upon Nature, but merely to make beautiful works of our own. These cannot, if they are really beautiful and reasonable, ever interfere or mar to any extent the beauty of the landscape, but will only serve in the long run to heighten its interest and charm. If this country should ever become depopulated in future ages, let the stranger wandering over it feel not only the beauty of its natural hill and forest and river, but, as well, the beauty and perfection and dignity of all that we have left behind us.

Before closing I have just one suggestion to make — one thought to lay before you — and I do it with all due deference, but with the greatest seriousness. The Fairmount Park Art Association has, it seems to me, devoted itself exclusively to only one field of art — to Sculpture — and that, one of the most advanced and developed and intellectual phases of art — one of the finishing touches. "Fairmount Park" and "Art": these two words are associated in my mind in a way which finds, I confess, a very incomplete reflection in the work of your Association. There is a far wider and more appropriate field for art in Fairmount Park than you have ever touched. The fact is that, until there is a place that needs sculpture for its decoration, sculpture is merely an intrusion. To place miscellaneous statues without reference to any scheme architectural in its broadest sense, as I have endeavored to explain, is treating neither sculpture nor Nature fairly. There should be the connecting link, "The Out-door Design," as I have called it, which leads up to sculpture and requires sculpture as its highest accent. What you have been doing is too much like varnishing a board before it is planed or before it is made into anything. With all due deference I would like to suggest that your Association should take up the study of the truly artistic possibilities of Fairmount Park with perhaps greater reverence for Nature, and for art as applied to it, and less concentration upon sculpture alone. The artificial works that have been perpetrated within the limits of Fairmount Park have, unfortunately, been executed with little artistic thought and skill. They are, to be frank, many of them abominably bad and a bitter disappointment to those who know that beauty instead of ugliness might have been created in many places. Nature has been desecrated in many ways, both in laying-out and planting, while the finer touches have been omitted almost entirely or left entirely to the work of your Association. Cannot the Fairmount Park Art Association stand for an insistence on more artistic work in Fairmount Park in the way of bridges, walls and roads? Must we from year to year look on while the beautiful wild banks of the Schuylkill are lined with vulgar river-walls, built with less beauty of curve or precision of line than a railroad would use and yet dressed in ostentatious fringes of jagged stone? I know, of course, that your work is conducted quite independently of the commissioners of Fairmount Park, and that the ill-judged and badly designed works within the limits of the Park are not your work. But, all the same, you have taken upon yourselves with your name a responsibility which the public of today, and, still more, of the future, would hold you to if it could. Can you not formulate, with all the means at your command and with all the weight which your membership carries, some plan by which the great possibilities of the Park may be realized? While you are paying your thousands to artists the city is paying its tens of thousands to workmen. Is there no method by which these two forces may be brought to work in one common channel to one common end?

WALTER COPE.

SOCIETIES

THE LATE JOSEPH M. WILSON, MEMBER OF THE PHILADELPHIA CHAPTER, A. I. A.

RESOLVED, That in the sudden and lamented death of Joseph M. Wilson, a Fellow of the American Institute of Architects, we are called upon to mourn the loss of a man distinguished by high professional aspirations and attainments, a dignified and courteous gentleman and a citizen of distinction. As members of the Philadelphia Chapter A. I. A. and as individuals, we mourn his loss and honor his memory.

Mr. Wilson was elected an Associate of the American Institute of Architects in 1871, and a Fellow in 1876. During his whole connection with the Institute he aided with voice and pen in the advocacy of the highest ideals of professional practice and honor. Our sympathy is duly tendered to his family and business associates in their bereavement.

Resolved, That this resolution be entered upon our records and copies sent to his family and to the firm of which he was for many years the honored head.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF MR. JOHN M. SULLIVAN, PETER PARLEY ROAD, JAMAICA PLAIN, MASS. MR. J. C. FOWLER, ARCHITECT, BOSTON, MASS.

HOUSE OF MRS. CATHERINE SMITH, PETER PARLEY ROAD, JAMAICA PLAIN, MASS. MR. JUNIUS H. MORSE, ARCHITECT, BOSTON, MASS.

THE FAULKNER HOSPITAL, WEST ROXBURY, MASS. MESSRS. KENDALL, TAYLOR & STEVENS, ARCHITECTS, BOSTON, MASS.

THE problem presented to the designers of the Faulkner Hospital, a fireproof suburban hospital of about fifty beds, was a somewhat unusual one, as the only possible location on the lot purchased was on a slope, to the south, of about 20 feet to the hundred.

A "pavilion" plan seemed most desirable, and especially so in this case, as the funds at hand precluded the possibility of building more than two-thirds of the proposed plant at first, and the unusual slope of the ground necessitated the combination of the administration, operating-department, nurses' home, service, heating and laundry in a single narrow building.

This central combination building is four stories in height and, as the pavilions can properly be of but two stories, the exterior was studied to produce a low domestic effect — the different departments disposed on the various floors as shown in the accompanying plans, with the kitchen, laundry and servants' rooms on the top floor.

The general scheme is to use one pavilion for male patients, the other for female, with the surgical cases on the first floor, and the medical cases on the second floor. Still further classification is possible with the isolation and private rooms provided.

The construction is of steel and concrete, vaulted walls, steel studding, and hard plaster. Exterior of water-struck hard brick, wide joints of white mortar, so laid as to produce the diaper shown. Trimmings of granite, terra-cotta and copper.

The floors are of maple, marble and terrazzo; finish of ash, and everything is of the most solid and substantial character.

DETAIL OF ADMINISTRATION BUILDING: FAULKNER HOSPITAL, WEST ROXBURY, MASS.

PRESBYTERIAN CHURCH, CRAIGSVILLE, VA. MESSRS. WARREN, SMITH & BISCOE, ARCHITECTS, BOSTON, MASS.

[Additional illustrations in the International Edition.]

"THE TECHNOLOGY CHAMBERS," BOSTON, MASS. MESSRS. KILHAM & HOPKINS, ARCHITECTS, BOSTON, MASS.

THE INSTITUTION FOR SAVINGS IN ROXBURY AND ITS VICINITY, BOSTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

ITALIAN BRONZE DOORS: DOOR TO THE BAPTISTERY, PISTOJA; — JOHN OF BOLOGNA'S DOOR IN THE CATHEDRAL, PISA; — DOOR IN THE SACRISTY OF S. FREDIANO, LUCCA; — DOOR OF THE SMALL THEATRE IN THE PINACOTECA, PARMA.

ITALIAN BRONZE DOORS: PRINCIPAL DOOR TO THE CATHEDRAL, LUCCA; — DOOR TO THE PALAZZO ORSETTI, LUCCA; — DOOR TO THE ABBEY OF MONTE OLIVETO MAGGIORE, NEAR SIENA: — DOOR TO THE MUSEUM OF ANTIQUITIES, PARMA.

ITALIAN BRONZE DOORS: NORTH DOOR OF THE BAPTISTERY, FLORENCE; — SOUTH DOOR OF THE BAPTISTERY, FLORENCE; — MAIN DOOR OF THE BAPTISTERY, FLORENCE; — DETAIL FROM SOUTH DOOR OF THE BAPTISTERY, FLORENCE.

ITALIAN BRONZE DOORS: DOOR TO SAN ZENO MAGGIORE, VERONA; — DOOR TO THE CATHEDRAL, BENEVENTO; — MAIN DOOR TO THE CATHEDRAL, MONREALE, SICILY; — SIDE DOOR TO THE CATHEDRAL, MONREALE, SICILY.

NOTES AND CLIPPINGS

COLORING MUSEUM CASTS. — The Art-director of the Bremen Museum has astonished his fellow-citizens by coloring and painting his immense collection of casts in imitation of the marble or bronze of the originals.

The work has been done with the sanction and help of Professor Ruedorffer, of Munich, and according to the *Kunstchronik*, the result has been greatly to enhance the interest of the collection, and relieve the monotony of long lines of white plaster figures. — *N. Y. Evening Post.*

Heating Shops by the Fan System. — Henry I. Snell, writing in *Cassier's Magazine* on the fan system of heating, says that the first shop heated by this system was furnished in 1873, and that now nine-tenths of all the large modern shops are using it. With it a fan-blower or an exhausting-fan of suitable design is located at any desirable place within or without the building. At the discharge outlet of the blower, or the inlet side of the exhauster, a proper amount of steam-heating surface is placed in the form of coils, cast-iron sections with vertical pipes of steel, or any of the various forms of cast-iron radiators, enclosed in steel-plate casings or brick chambers and connected with the fan. At the discharge outlet of the fan should be a main warm-air duct from which will lead various branches, properly designed and located, with outlets for the most efficient distribution of the warm air. For supplying the heating coils live steam may be furnished from the boilers, or exhaust steam from the engines driving the works. The power for driving the fan may be supplied by a steam-engine, electric-motor, or belt transmission from main shafting. The cost of installing a fan-system is very often less than the instalment of a system of direct or indirect steam-heating, or hot-water heating, of equal effectiveness. The determining quantity in the cost is the amount of galvanized-iron air-distributing pipe, which is a varying quantity in shops of the same size and exposures, depending upon the existence and location of party-walls or office-rooms, and the location of the apparatus.

Italianized English. — The opening of the tunnel in the heart of the Eternal City, through the Quirinal Hill and under the royal palace, has brought forward the interesting question of what it shall be called. At first the English word tunnel was used, as a matter of course, the pronunciation being peculiar, but still recognizable, until a cry was raised by the purists, who insisted that as there was an Italian word it should be used. The choice lay between "galleria" and "traforo." The *Giornale d'Italia* opened a kind of referendum among the best-known authors and literary people, the result being that the majority were for "traforo," which means "through a hole." While in England foreign words, especially Italian ones in music, are accepted in their entirety, such as "crescendo," "piano," "allegro," etc., in the Peninsula they are always Italianized, which produces some most ludicrous results. For instance, beefsteak has been turned into "bistecca," which is applied not to the kind of meat, but to the mode of cooking it, so that one demands beefsteak of veal without a smile, the waiter not having the remotest idea that you are using or misusing a foreign word. Another term is "tramway," which has been made over into "tramvia," and, of course, means the same thing. Then there is meeting, which has become "miting," and to which another syllable has been added, making "mitingaio," which signifies a man of high-flown language who impresses the masses. — *Pall Mall Gazette.*

Even a Draughtsman can be a Hero. — In the crowd that watched the fireworks display in Madison Square Park on the night of election day was a man of fifty, a draughtsman, employed by a contracting-company of this city. He was near the men who were setting off the pieces, and when the explosion occurred, a big piece of one of the iron mortars tore off one of his legs. Panic and confusion followed the disaster. There was no immediate aid for him, nor for a small boy lying near by. The man called for aid for the child, but, though using four languages, he could not make himself heard or understood. He lay there until a dying man called for a priest. No one else responding, the injured man dragged himself over the intervening distance and managed to raise the poor fellow in his arms, while a priest, opportunely arrived, administered the last rites. Then the unnamed hero patiently lay, waiting for assistance, meanwhile pressing his thumb on the severed artery. After a half-hour's delay, he reached the hospital. There the surgeons said that his life was saved only by his cool precaution. At the hospital the patient was cheerful, even joking over his maimed condition. Only one thing worried him; he feared he would lose his situation. Learning of this, his employers promptly sent him word that his place would be kept open. Now, the only trouble they have on his account is because of his constant requests that some of the office's work be brought him at the hospital. He had been engaged on an important set of drawings, and to pacify him, he has been allowed to work at a few of the plans while lying in his cot. — *N. Y. Evening Post.*

Incandescent Lamps. — The manufacture of an incandescent electric-lamp is of special interest because many of the operations have heretofore been regarded as trade secrets and carefully kept from the public. The delicate filaments which produce the light are formed by squirting a paste made from cellulose (wood pulp) through dies, from which it emerges in the form of fine threads, which when dried are tough and flexible. These threads before they are dry are formed into the desired shape. They are then packed in carbon-dust and subjected to intense heat for many hours. The cellulose is completely charred, and the filament now practically consists of charcoal. It is then suspended in an atmosphere of hydro-carbon vapor, in a vessel in which a partial vacuum has been made, and a current of electricity sufficient to bring it to incandescence is sent through it. This decomposes the hydro-carbon, and a carbon-soot somewhat resembling graphite is deposited on the filament. This is technically known as "flashing." After this treatment the filament has a metallic lustre resembling polished steel. The glass-bulbs are blown in moulds to secure absolute uniformity, and as they come from the glass-house they are perfectly smooth at the rounded end and have a long open neck. To the rounded end is fused a short length of glass-tubing opening into the interior of the bulb. This is subsequently used for connecting the bulb to the exhaust pump. For making the connection through the glass between the carbon-filament and the wire the most satisfactory material is platinum, because it adheres firmly to fused glass and because it expands and contracts at the same rates. If this were not the case when it got hot through the passage of the current it would either expand more or less than the surrounding glass, and either break it or make a space through which air would leak. So through the little glass stopper which will eventually project down into the neck of the bulb are fused two platinum wires. This stopper, which has a flange at one end, is now called the mount or stem. Next, the filament is fastened to the ends of the platinum which projects from the stem. This is accomplished by means of a special cement which will stand a red heat. Over this paste is deposited a layer of carbon. The paste is then dried in an oven, and the stem, with its attached filament, is fastened onto the bulb by fusing the flange on its upper end about the neck of the bulb. After this joint is carefully tested to be sure there are no leaks, the exhaustion of the air is accomplished by means of a mechanical air-pump, the last traces of gas or air being removed from the bulb by chemical means. When the vacuum is sufficiently high the tube through which the air has been exhausted is sealed off by means of a small lamp, leaving the small round tip seen on the spherical end of the finished lamp. The lamp is now practically completed, and is sent to the testing-department. Here it is subjected to a series of severe tests before it is considered ready for the market. If it passes these successfully the base (the portion by means of which it is screwed into a bracket) is cemented on, and the completed lamp goes to the shipping-department. — *The Electrical World.*

Streetside Trees in Washington. — With the same care that a Tammany district-leader studies the voting strength of his bailiwick, Col. John Biddle, the Engineering Commissioner of the District of Columbia, enumerates the trees in the public streets. This year the total number of trees residing in the district highways was 84,487. The death-rate of trees for this year was 647; the new trees set out numbered 2,600. The varieties used for planting this year were elms, lindens, Norway, silver and sugar maples and pin and willow oaks. A nursery containing 22,000 seedlings is also maintained for the purpose of providing a supply of trees for annual planting. Washington, more than any other American community, is a city of trees. The broad avenues and low buildings combine to offer the least possible amount of protection from the Southern sun, and only the shade of the numberless trees makes the streets tolerable in summer. Of late years the asphalt paving has caused a great mortality in trees. Not so many years ago Pennsylvania Avenue, from the Treasury Building to the Capitol, was a finely-shaded promenade, along which Congressmen walked almost in procession up to the Capitol in the morning and back in the afternoon. Those trees are gone now, and the pleasant morning stroll is impossible when the sun begins to strengthen. — *N. Y. Tribune.*

Anthracite Coal. — Anthracite coal, which we are all so anxious to get just now, was, less than a century ago, when the first efforts were made to market it, denounced as a fraud. The people of those days declared it was impossible to burn such "stone." At the close of the eighteenth century, in 1791, the Lehigh Coal Company tried in vain to sell in Philadelphia the new fuel which had been found on its property in Carbon County. Several attempts were made to burn anthracite, but for a long time the results were uniformly unsatisfactory. Finally, in 1815, the secret was accidentally discovered. Tests had been made in a rolling-mill at Schuylkill. After repeated attempts to make it burn by means of frequently raking the fire, the workmen gave up the experiment in disgust, filled the furnace with the worthless "black stones" and left it. Returning a few hours afterward they were amazed to find a fierce fire with a terrific heat, and thenceforward the problem of burning anthracite was solved. But the people were slow to believe that it was possible to get heat by burning the black stones. As late as 1833 one Charles Miner wrote as follows: "While we push forward our labors at the mine, hauling coal, building arks, etc., we had the greater difficulty to overcome of inducing the public to use our coal when brought to their doors, much as it was needed. We published handbills in English and German, stating the mode of burning the coal, either in grates, smiths' fires or in stoves. Numerous certificates were obtained and printed from blacksmiths and others who had successfully used the anthracite. Mr. Cist formed a model of a coal stove and got a number cast. Together we went to the several houses in the city and prevailed on the masters to allow us to kindle fires of anthracite in their grates erected to burn Liverpool coal. We attended at blacksmiths' shops and persuaded some to alter the 'too-iron,' so that they might burn the Lehigh coal; and we were sometimes obliged to bribe the journeymen to try the experiment fairly, so averse were they to learning the use of a new sort of fuel so different from what they were accustomed to." But even these methods were slow to overcome popular prejudice. It was only when, through a sudden rise in the price of charcoal, the manufacturers began to use anthracite that the new fuel found its way into favor. — *Toronto Mail and Empire.*

The Reichsrath Fountain in Vienna. — The grand fountain at the approach to the Reichsrath in Vienna, the imperial Parliament House, has recently been finished. From the centre of a great basin of marble rises a pedestal with a colossal figure of Minerva. Against the four sides of the pedestal are groups of figures larger than life. In each group two figures represent Austrian rivers, so that eight rivers in all are symbolized. Between each pair a stream of water pours from a jar into the basin, while behind are genii and cupids. — *N. Y. Evening Post.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. LXXVIII SATURDAY, DECEMBER 27, 1902 No. 1409

CONTENTS

SUMMARY: —

Costliness of Single-family Dwelling-houses in New York. — Cost of Land near Wall Street, New York, N. Y. — Proposed Parkway for Philadelphia, Pa. — A Light-and-Air Case in New York.—The Glass-blowers' Union and the Window-glass Trust. — Attempt to get Window-glass on the Free List. — The Freezing Process and the Pennsylvania Railroad Tunnel. — A Curious Property of Clay. — Municipal Ownership in England. — A Bit of the Parthenon Frieze found in an English Garden. 97

THE THIRTY-SIXTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS. — II 99

THE IMPROVEMENTS OF WASHINGTON. 101

THE ARGIVE HERÆUM. 102

BOOKS AND PAPERS. 103

ILLUSTRATIONS: —

Chapel of the Troy Orphan Aslyum, Troy, N. Y. — A City Residence, New York, N. Y. — Church and Parish House for St. Mark's Parish, Paterson, N. J. — Stable for the Standard Coach-horse Co., 41–43 West 63d Street, New York, N. Y.

Additional: The Woman's Club-house, Worcester, Mass. — House on Commonwealth Ave., Boston, Mass. — The Château de Josselin, Brittany, France. — Bedchamber of Françoise de Foix, Chateaubriand, Brittany, France. — Interior of the Collegiate Church, Nantes, Brittany, France. 103

NOTES AND CLIPPINGS. 103

THE newspapers call attention again to the enormous cost of modern dwelling-houses in New York, which now far surpasses anything known in London or Paris. In Paris, although, as in New York, the population is divided between the many poor and well-to-do people who live in tenement-houses or apartments, and the few rich who have a whole house to themselves, the Parisian "hôtel," or single dwelling-house, is a much simpler affair than the New York mansion. For a building-lot, twenty-five feet wide and one hundred feet deep, in the middle of a block on Murray Hill, which still continues to be the fashionable quarter, seventy-five thousand dollars is considered a low price, and few houses are built on such lots which cost less than one hundred thousand dollars, above the value of the land; while, within the present year, sixty-seven houses have been built, valued at from five hundred thousand to six hundred thousand dollars apiece. Two causes seem to favor this enormous increase in the cost of dwellings for rich people, and for land suitable for them; one being the great influx into New York of very wealthy people from all parts of the country, who come there to enjoy the luxury of the second city in the world, and are ready to pay almost any price for a foothold; while the other is the very limited area in New York which is really desirable for the best class of houses. In Paris, the newcomer and his family can settle in the Faubourg Saint-Germain, or in almost any part of the large district between the fortifications and the river, west of the Madeleine, or in the "annexed district" of Neuilly, without feeling themselves cut off from fashionable society; and the proposed demolition of the fortifications will still further extend the fashionable district; but, in New York, the pleasanter parts of the town are surrounded by the tenements of a vast and increasing foreign population, contact with which is fatal to the pretensions of any family to fashion. So sharp is the boundary-line between the fashionable quarter and that occupied by the foreigners that a New Yorker can almost infer the nationality of an unknown person from being told where he lives. Of course, there are comparatively inexpensive regions in New York where artists and men of letters can live together, just as Paris has its Latin Quarter; but the New York Bohemia is by no means so pleasant as that of Paris, and the people who live in it must submit to be elbowed at every step by unsavory Poles, Russians or other foreigners. To sensitive persons, who object to such contacts, Fifth Avenue and the neighboring streets form, therefore, a sort of Paradise of respectability, in which every one desires to take refuge who can afford to do so; and, as there are now plenty of people who can afford themselves such a luxury, they, practically, bid for it against each other.

THE New York newspapers are, perhaps, unnecessarily astonished at the price just paid for the Trinity Building, which brought one hundred and ninety-eight dollars per square foot; and some of them indulge in rather wild dreams of the future of Manhattan real-estate. As a matter of fact, the price paid for the building was rather low, considering the advantages of its situation. Mr. Mills is said to have paid about three hundred dollars per square foot, twenty years ago, for land in the middle of a block, on Wall Street, for the sake of giving his Broad-Street building a Wall-Street entrance; and the Trinity Building, fronting on Broadway, almost at the head of Wall Street, with another street in the rear, and Trinity churchyard on the south, should be intrinsically worth more per square foot than any property on Wall Street, and, perhaps, more than any other estate in New York. In the same way, the Park Street Church estate, in Boston, recently sold at about one hundred and forty-four dollars per square foot, was a bargain for the purchasers, who, although they are restricted as to the height of the building that they can erect on it, have unlimited light on three sides, while the subway cars and trains bring about ten thousand people an hour to their door.

THE Philadelphia Parkway Association, of which Mr. Albert Kelsey is the Secretary, has issued a very pretty and interesting pamphlet in aid of its scheme for cutting a wide parkway in a straight line from the City Hall, through Logan Square, to Fairmount Park. Architects who know Philadelphia do not need to be told of the comparative poverty of the city in dignified features; and the City Building itself, although one of the costliest and most magnificent municipal structures in the world, cannot be seen, as a whole, except from a point so close that its architectural effect is spoiled. It is estimated that the new parkway will not cost more than five million dollars, and this sum should easily be made up by the increased value of the land fronting upon it. Apart from this, however, a street of this kind through the middle of a city so closely and monotonously built up as Philadelphia would be a great public benefit. Beautiful and interesting as Fairmount Park is, it seems a long way off from the poorer quarter of the city, and a wide street through the middle of this portion, leading straight to the Park, planted with trees, and itself constituting a charming promenade, would be a great blessing to the people who now rarely, or never, see the Park.

ALTHOUGH, fortunately for the owners of twenty-story office-buildings, no general light and air easements are recognized in this country, there are circumstances in which the tenant of a building can legally prevent the light from being cut off from a window important to him. A case involving this principle was tried a few days ago in New York, where the tenant of an office in a large building on Forty-second Street sued for an injunction to restrain the owner of the building from making an extension of it which would cut off light from a window in the office in question. The court held that the contract of lease between the owner and the tenant implied that the latter should continue to enjoy, during the term of the lease, so far as any operations of the owner were concerned, the same amount of light and air that the premises received at the beginning of the lease; and that the owner could not rightfully diminish such light and air. An injunction was, therefore, issued against the owner, and he, and other owners in New York, will, henceforth, have to ask leave of their tenants before darkening their windows.

A RATHER extraordinary development in American economics is just now attracting the attention of the newspapers. Our readers know something of the proceedings of the window-glass trust, which, a few years ago, conceived the idea of shutting off competition by making friends with the glass-blowers' union, and supplying its officials, as is reported, with several hundred thousand dollars' worth of shares in the trust, with the understanding that the union would drive out of business all the independent window-glass factories, by refusing to allow union men to work in them. This contrivance was

Copyright, 1902, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass.

Entered at the Post-Office at Boston as second-class matter

perfectly successful, and, within a few months after it was put in operation, every independent window-glass manufactory in the country had closed its doors. As usually happens in such cases, however, the trust soon found that the weapon which had proved so efficacious against its competitors had two edges; and the union began to try its hand at keeping to itself some of the advantages which it had so easily procured for its partner. The number of union members was restricted to about two-thirds the force requisite for operating the factories of the trust, so as to guard against the possibility of any member being left unemployed; and new members were admitted only under severe conditions, and on payment of an admission fee said to be five hundred dollars; while the output of glass by the trust was limited to a quantity prescribed by the union. Things have gone on in this way for two or three years, and, curiously enough, it is workingmen who have been the first to rebel, the Knights of Labor, of which the glass-blowers' union is an assembly in good standing, having officially prepared a petition to Congress to have window-glass, which now pays a duty of about one hundred per cent, put on the free list, for the reason that the duty prevents the adoption of improved methods of manufacture, unsettles business through arbitrary changes in prices at the dictation of the confederates, and makes the Government of the United States a partner with "this greedy monopoly of manufacturers and blowers, who are a detriment to the industry, and a curse to the country."

THE high-tariff orators have so often wept with joy over the beneficent results to the workingman of protective duties that this appeal of the most respectable and most powerful labor organization in the country to have the duty altogether removed from one of the most highly-protected manufactures will come upon them like a cold shower-bath. There is not the slightest probability that window-glass will be put upon the free-list for two years, at least, for the obvious reason that if the Knights of Labor were gratified by being enabled to buy English and Belgian window-glass at half the price that they now pay for it, they would soon be clamoring for the privilege of buying eggs and butter and meat and vegetables from the Provinces for half what they now pay, and clothing and blankets and shoes and leather and wool and a thousand other things, for prices approaching those for which the same things, often made in America, and exported, are sold abroad; and the system of high protection would begin to crumble away.

MR. CHARLES SOOYSMITH proposes to apply to the construction of the Pennsylvania Railroad tunnel under the Hudson River, which is now assured, the freezing-process already used in sinking mine shafts, by which soft earth around the excavation is frozen, so as to keep its place until the supporting lining can be put in. The soil under the Hudson River, opposite New York, is a fine silt, of great depth, and seems well adapted to treatment by freezing. In order to reach the silt with the chilled brine used for freezing, it will be necessary to drive a small "pilot tunnel" through the middle of the proposed excavation, in which the main pipes will be carried, distributing the brine around it by means of radiating-pipes.

MR. H. J. CAMBIE, of the Canadian Society of Civil Engineers, has made a curious and important observation upon clays. It appears that a portion of the Canadian Pacific Railway passes though a valley almost without rainfall, through the bottom of which flows the Thompson River. Above the river are high clay bluffs, forming the edge of a sort of table-land, some two hundred feet above the river. When irrigated, this clayey table-land is fertile, producing several crops of hay a year, and the farmers utilize it for that purpose, irrigating it with water from the river or its tributaries. Since irrigation of the land began, some forty years ago, there have been many land-slides. One of these, a few years ago, carried a tract of about a hundred acres directly across the river, forming a dam seventy-five feet high, and completely blocking its course; and another recently damaged the railway. In consequence of the latter, suit was brought by the railway company, to prevent the farmers from irrigating their fields, on the ground that the irrigation softened the clay subsoil, allowing the ground to slip. This view was confirmed by experiment, the experts, of whom Mr. Cambie was one, finding that while ordinary clay, in the moist condition in which it is usually found in the ground, will not absorb any more water, and is only superficially affected by washing, clay that has once been so completely dried as to lose its cohesive property absorbs water like a sponge until some sixty per cent of its weight has been added, when it falls into a liquid mud, nearly as fluid as water. Even when the clay has not become powdery by drying, but has taken the form of indurated lumps, it will still soak up water until converted into fluid mud. As the clay of these hayfields exists, to a great extent, in the form of such dry lumps, it seemed probable that copious irrigation through the season might liquefy it, so as to allow the ground over it to slide; while the objection that the clay on the immediate bank of the river was not affected appeared to be answered by the fact that this clay, being constantly kept moist by the water of the river, preserved its solidity.

A CONTRIBUTOR to the New York *Tribune* has sent long and rather attractive descriptions of what he calls the "municipal activities" of certain English cities, particularly in Yorkshire. He is evidently a partisan of collectivism of this sort, and the showing which he makes is tolerably good, although the fact that Sheffield, one of his model towns, "is barely beginning to receive substantial returns" from its "large investments in municipal undertakings," some of which have been five years in operation, suggests to the skeptical mind a suspicion that, when the bills for repairs and renewals, which, under ordinary circumstances, begin to be formidable soon after the fifth year, are all paid, the "substantial returns" may look a little less substantial. We have no desire to undervalue municipal enterprise in behalf of citizens, but it is notorious that the temptation to neglect renewals and repairs, for the sake of making a good financial showing, is too strong for most municipal managers to resist; and, as has already happened in at least one case, a "municipal activity" which showed gratifying returns from year to year may suddenly have to be abandoned, with most of the capital sunk in it, for the reason that the plant had been so neglected and abused, in the effort to show a good income over expenses, that, when it finally broke down, there was nothing worth saving in the whole equipment.

AN illustration of the British "reverence" for art is afforded by the recent discovery, in a "rockery" on an estate in Essex, of a piece of marble, or, rather, of two pieces, bearing a Greek inscription of the fifth century B. C., and another piece, sculptured, which turns out to be a missing portion of the Parthenon frieze, belonging to the group of horsemen in the Panathenaic procession. The inscribed slab of marble is known to belong to a monument set up in Athens in honor of the volunteers from Cleonæ who fought on the side of the Athenians in the battle of Tanagra against the Lacedæmonians and Eubœans, and is also known to have been brought to England about 1770. According to the accounts, it was picked up in Athens by Stuart, who was then engaged in writing his great book on the "*Antiquities of Athens*," and sent, with some other marble fragments, in charge of a sea-captain of his acquaintance, to Smyrna, where he expected to find it on his way home to England. When Stuart reached Smyrna, however, his marbles had disappeared, and it was not until after his arrival in England that he found them in the hands of a Mr. Jones, to whom they had been presented by a naval officer. The inscription was at that time copied and published, but Stuart seems never to have claimed his property. Meanwhile, a noted antiquary, Thomas Astle, is known to have been in the neighborhood, and is quite likely to have bought the old stones of Mr. Jones, and to have carried them off, for the rockery which they until recently adorned stands upon an estate which once belonged to him. We may surmise that, on the death of Astle, who, at least, knew something of the value of his marbles, his surviving relatives lost no time in clearing out the "old rubbish" which he had collected, and that anything so uninteresting as old Greek bas-reliefs or unintelligible inscriptions soon found their way to the ash-barrel, whence they seem to have been rescued by the gardener, in search of lumps of rock for sheltering ferns. Although the rains of a hundred and fifty years have ploughed "grooves" in the face of Phidias's aristocratic young horseman, the figure does not seem to be any worse off than the mangy wrecks which represent, in the British Museum, the rest of the frieze.

THE THIRTY-SIXTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.[1]—II.

THE Committee on Foreign Correspondence reports steady increase of exchanges and correspondence.

The "*Proceedings*" and the "*Bulletin*" have been sent to forty-six foreign societies, to nineteen foreign periodicals and to fifty foreign correspondents. The book on gardens published under the auspices of the Institute was forwarded to forty foreign societies.

Societies in the principal cities of the world have been requested to send the Institute their building and municipal regulations, and replies have been received from London, Paris, Berlin, St. Petersburg, Buda-Pesth and Brussels. St. Petersburg has asked information about the course of study in our schools, and has received with thanks the information desired.

The Committee on Contracts and Lien Laws has, in conjunction with a committee appointed by the National Association of Builders, revised and published the uniform contract.

The joint Committee has endeavored to preserve as much as possible of the form in use for the past thirteen years, leaving out objectionable features, simplifying and adding some clauses. The most notable omission is that of the clause designating the architect as the agent of the owner.

Article II has been modified to clearly show the architect's ownership of the plans and specifications, and that the charges for the architect's services and use of plans are to be paid by the owner, thus condemning the unprofessional practice of making contractors pay for detail drawings.

The Arbitration Clause has been made more effective, to facilitate settlements out of court of disputes not adjustable by the architect.

The Committee had before it the form of contract approved by the Royal Institute of British Architects, a Washington form, and numerous forms from individual architects, and believes it has, under legal advice, provided a form to meet emergencies which deals justly with owner and contractor, which will admit of almost universal application and be used even more than the previous form. Of the latter were sold about 40,000 copies per year.

The Committee thinks that general adoption of this form of contract will give it a standing in the courts which no individual contract could possess.

The Committee to report on Reports of Special Committees submitted the following: —

The Committee on Conference with the Architectural League on Competition, Codes and Coöperation asks to be discharged, offering no suggestions except a general recommendation for some appropriate action to clear up doubtful clauses in the Code of Competitions.

The Committees on Legislation for Government Architecture and on Fine-Arts Commission and Bureau of Architecture simply report progress and state that, on account of conditions already existing, favorable in many points-of-view, they find it unadvisable to urge any decided changes at present.

The World's Congress Committee has no recommendations to act upon, in view of the postponement of the St. Louis Exposition.

As to the other Special Committees, appreciation of the work of each is noted; the aid of every member of the Institute in furthering the important work of the Municipal Improvement Committee is urged, and, finally, attention is called to the importance of matters before the Committee on Competitions and the supreme necessity, where competitions are necessary, for a clear statement of conditions, with competent advisers and with judges of the highest standard.

Following are excerpts, copies, or résumés, of the more generally interesting of these Special Committees' reports: —

The report of Mr. Alfred Stone, the delegate to the National Fire-protection Association and to the National Conference on Standard Electrical Rules, contained matter of interest. He had been appointed upon request of the Fire-protection Association that a representative of the American Institute of Architects attend its annual convention, and attended in that capacity a convention in Philadelphia in May last.

The membership of this Association is drawn from stock fire-insurance companies, and mainly from persons having charge of the improvement and inspection of risks. The objects are: "to promote the science and improve the methods of fire-protection, to obtain and circulate information on this subject and to cause coöperation in matters of common interest," but with no regard to insurance-rates.

Mr. Stone met with a cordial reception. There were discussed: "Danger of Fires in Breweries"; "Fireproof Construction"; "Uniformity of Construction"; "Protecting Coverings for Doors and Windows"; "Automatic Sprinklers," etc. Mr. Stone remarked that the architect's education and experience fit him to appreciate better than the insurance-companies the requirements in such special cases, and also that the companies have suffered largely from bad construction, for which the architect has been sometimes responsible, the owner often through unwillingness to pay the extra cost of fire-protection, for which until lately the insurance-companies have given him no allowance. He notes a great change already effected and a greater in prospect through coöperation of insurers and insured, and points out how the architect can advance this improvement by advocating better methods of construction and by inducing the companies to recognize these better methods and to make corresponding reductions of rates.

He recommends the Institute to continue its representation, as invited, at the conventions of the Association.

The delegate also attended the National Conference on Standard Electrical Rules, endorses the effort to establish a uniform code of rules for the country, such as now enforced in large cities with material gain in safety to life and property, and recommends that the Institute continue its representation at these conferences.

A resolution that the Board of Directors be authorized to appoint delegates in accordance with these recommendations was passed.

The committees on a Fine-Arts Commission and a Bureau of Architecture carefully discussed the subject of a "National Bureau of Architecture" and other fine-arts, and drew up various suggestions. At first they hoped to prepare a working-scheme for a commission or bureau that would ensure the execution of work in Washington on the lines prepared by the Park Commission. They hoped, too, that purchases of works of art by the Government might be made under expert advice, that the building work of the Government might either be put under one control, or that the different Departments might adopt methods as intelligent as those of the Treasury Department.

It was found, however, that the members of the Park Commission (who were well informed as to Washington affairs) felt that although the consummation of the scheme to place the work of the Government under the direction of a commission or bureau, created for the purpose was eminently desirable, yet it would be unwise to press this question upon Congress until after the work of the Park Commission had been submitted and passed upon by Congress and its value estimated. They thought it should be remembered that this Commission was created through the efforts of the Institute of Architects, and to propose the appointment of another Commission before the work of the first has been publicly justified would seem premature and unwise. They urged that with delay the proposition might be brought up with much better chance of success.

These opinions controlled the Committee. They were the more willing to remain inactive seeing that the number of buildings produced under the Treasury Act would soon be much greater and probably be standing argument for a general change; and, besides, they saw other Departments, like those of Agriculture and War and the District of Columbia, adopting methods similar to or, perhaps, better than those in use by the Treasury Department.

The attitude of the Government towards artistic work has been constantly and rapidly improving. The question seems to be whether when the disposition towards art is in such an improving condition it is well to be contented or to strive for still better things during these favoring conditions. Until now the Committee, following to a great degree the urgent advice of the Park Commission, have thought it wiser to delay action.

The Report of the Committee on Competitions, an interesting one, reads as follows: —

"There have been no stated meetings of the Committee during the year. The Code which resulted from our first report was an experimental one and there is evidence that it has already had a beneficial effect on the conduct of competitions. Those who draughted the Code thought it undesirable to state that certain forms of competition were disapproved and considered it sufficient to name the existing forms and point out what results were desirable and how best obtained.

"In one instance, at least, the attitude of the framers was misunderstood, and it was claimed that a competition where certain competitors were paid one price, certain others another price, and others again paid nothing, for rendering the same service, was a form of competition approved by the American Institute of Architects. If the Code was generally understood to have this meaning the Committee suggest that it be modified, or some explanation appended. The new duties of the Committee have not been exercised to any great extent. The Committee has stood ready to advise when requested, but have not thought it incumbent upon them to offer advice unasked, or to interfere when unsatisfactory conditions of a competition have been brought to their attention by others than those directly interested.

"The operations of customs and public opinion are steadily trending towards a clearer understanding of the interests that are served by a competition, and the best way of reaching results. The public, as well as the profession, are beginning to appreciate the importance of the jury; and the more undesirable forms of competition are being gradually eliminated.

"When all is said there is one supremely important condition in any competition which far outweighs any consideration of the number of those who compete, or the payment to the competitors, and that is the employment of professional service both for the programme and for the award. No competition may rightly be called improper if it is fairly stated and fairly judged. The best man will compete under the Tarsney Act, although there is no compensation; first-rate men entered the competition for the Washington Hospital. In both cases the assurance of fair play was the sole operative factor.

"In view of this fact it is evident that a great responsibility rests on any architect who is asked to serve as expert either in drawing up or judging a competition. With him, to a large extent, rests the

[1] Continued from No. 1408, page 93.

future of competitions. Even the most careful man acting in this capacity is apt to be betrayed by his committee.

"Our attention has been called to the result of a competition recently held for the Foundry Methodist Episcopal Church in Washington. The Committee pledged themselves not to open the envelopes containing the names of the competitors until a final selection was made — which final selection was to be made by the Quarterly Conference on the report of the Committee and its adviser.

"One of the envelopes was opened by the Committee before the decision of the Conference, and the Committee had a consultation with the architect, whose plans were modified in essentials and then accepted by the Conference. Their professional adviser, Mr. James Knox Taylor, was not consulted in this action, and it is greatly to be regretted that a competition, in which the chief security for justice lay in the acknowledged position of the professional adviser, should have been decided in direct violation of the terms of the programme, to the injury of the other competitors and of the professional adviser, who was unwittingly involved in this scandal.

"The Committee wish to reiterate what is, indeed, the publicly expressed opinion of the Institute, that the best results are obtained without competition, but that where competitions are necessary, good advice in the programme and fair judging and award by competent experts are the most important features. Finally, that the limited properly paid competition is the properest form, producing the best results for the owner and encouraging the self-respect of the architect. To be asked to compete on such conditions is an honor; to be asked to compete on other terms is not an honor, but a request for a favor.[1]

"The method of selecting the architects to compete for the Liverpool Cathedral opens up a new phase of the matter which has possibilities. The authorities in their general circulars ask any man who has done church work which he considers worthy to send them photographs or drawings of such work, and the Committee, from the actual performance, will select the competitors. From this position it is but a step to select an architect in the same way; in other words, to let the competitors submit for judgment, not studies for the proposed building, but drawings or photographs of similar work which they have done, with such evidence as they wish or the Committee desire as to their ability, and have the competition decided on the ground of past performance — which is, after all, a better guaranty to the client than a clever plan or a happy solution of a problem.

"In closing, the Committee would urge that every member use his influence to discourage competitions where they are not essential, and to see that programmes are carefully drawn up and the work fairly judged, where competitions are necessary. But above all, that they should exercise the greatest care and discretion when acting as professional adviser."

The Committee on Municipal Improvement reports a paper prepared by the Chairman for the American Park and Out-door Association on "The Relation of the A. I. A. to Municipal Improvement," in general drawing particular attention to the part of the Institute in the appointment of the Washington Commission and to the admirable work of that Commission. This paper was read by Mr. Albert Kelsey at the meeting of the Association held in Boston in August, from which meeting resulted a Committee on Federation of many societies of kindred aims, on which the Chairman (Municipal Improvement Committee A. I. A.) has been invited to represent the Institute. The Committee stands ready to give advice in specific cases to any local body. The Committee is in receipt of numerous reports from correspondents showing a great general interest in municipal improvement and describing the progress of the movement in several cities. An abstract of these reports will be printed in the "*Proceedings*."

During the afternoon session of Thursday the Convention heard papers on "The Improvement of Washington" (illustrated with lantern-slides) by Daniel H. Burnham, Frederic Law Olmsted, Jr., and Charles Moore.

The latter is printed with this account of the doings of the Convention.

The Evening Session of Thursday was held at the Library of Congress, where the members met at 8.30 o'clock to examine and have explained to them the drawings and models submitted to the Senate Committee on the District of Columbia by the "Park Commission," D. H. Burnham, C. F. McKim, Augustus St. Gaudens, and Frederic Law Olmsted, Jr.

The Morning Session of Friday, Dec. 12, Second Vice-President Alfred Stone in the Chair, opened with the reading of a paper by Captain J. S. Sewell, Corps of Engineers, U. S. A.

Then followed some discussion of matters kindred to the subject of this paper, the Chairman remarking that Boston has a standardized specification such as Captain Sewell recommended, and Mr. Andrews following with an interesting account of the coöperation of architects and engineers in the planning of Boston schoolhouses. A paper by Mr. Smithmeyer on "The Evolution of Design" was read. Mr. Gilbert offered the following tribute to the memory of Walter Cope: —

"In the recent sudden death of Walter Cope, this Institute has lost one of its most distinguished and valuable members. Mr. Cope was born in the year 1860 and had therefore reached only his forty-second year. Yet in spite of the comparatively few years that he had been in active practice, the firm of Cope & Stewardson had produced many buildings of the highest interest.

"Commencing their more important and characteristic work with Denbigh Hall at Bryn Mawr College at a time when John Stewardson was still alive, the firm has executed at Bryn Mawr, at Princeton, at the University of Pennsylvania, and at Washington University, St. Louis, a series of collegiate buildings of a beauty and appropriateness that have fixed the attention and aroused the enthusiasm not only of architects and educators, but of the general public. Adopting a type of later English Gothic or Jacobean and modifying it to meet the requirements of local materials and of modern methods of instruction, Mr. Cope (who, after the death of John Stewardson, was, in all artistic matters, the unquestioned head of the firm) gave to his collegiate buildings an expression of eminent fitness to their uses, while still markedly insisting upon the continuity of our architectural traditions.

"It was, however, not alone in college work, but in buildings of the utmost diversity of purpose, that his talents were manifested. Judged by the standard which Matthew Arnold holds as the true test of artistic and literary performance, excellence sustained at a high level through a great volume of work, Walter Cope's buildings must be regarded as having reached the foremost rank of contemporary architectural achievement.

"In maintaining the standards of professional conduct established by the Institute, Mr. Cope was unswerving and inflexible. Upon his companions the impressions left by his work are of his constant sincerity, his spontaneity and truthfulness, his joy in art, his splendid scorn of wrong."

A resolution was offered by Mr. R. S. Peabody in respectful memory of the late Senator MacMillan.

Resolved: That by the death of Senator MacMillan our art has lost an active and appreciative advocate. For his broad-minded interest and intelligent coöperation with architects and artists in their efforts to beautify Washington our profession and the country will long remain his debtor.

The matter of the admission to the Institute without examination of graduates of architectural schools was brought up. Professor Warren expressed his opinion that "special course" students should be examined before admission, but that holders of a degree in architecture from schools, having a four years' course, which are departments of architecture in chartered institutions of learning should be admitted without examination.

It was decided that a list of schools be prepared.

An amendment admitting holders of degrees from foreign institutions was referred back.

Mr. Gilbert reported fund of $15,000 raised toward payment for the Octagon House, from subscriptions of members present at the Convention.

In the Afternoon Session of Friday papers were read as follows: W. B. Las Casas on "Organization for Municipal Improvements," Albert Kelsey on "The Modern City," Owen Fleming on "Improvements in London."

These papers were illustrated with lantern-slides and were all of great interest. Mr. Fleming's paper on "London," which was read for him, will be published later. Mr. Owen Fleming is Secretary of the Architectural Board of the Council of London in charge of improvements.

In the Morning Session of Saturday, December 13, Second Vice-President Stone in the chair, much unfinished business was satisfactorily despatched. The members had previously, by invitation of the President of the United States, met at the White House and were conducted over the building and shown the work of remodelling which has been done by Mr. McKim.

On meeting in the Convention-room a paper was heard from Captain Sigsbee, U. S. N., on a project of his for permanent marble review-stands in Lafayette Square.

Mr. Marshall, of the New York Chapter, brought up the question of an architect being called upon to give bond to fully discharge his duties and to guarantee his construction and limit of cost, which proposition the New York Chapter desires to reject.

Some miscellaneous business before the Convention being disposed of, the Convention adjourned at the end of the morning hour with the casting of ballots and announcement of officers elected and the place of meeting for the next Convention.

Ballots for election of officers resulted as follows: *President*, Charles F. McKim; *First Vice-President*, Frank Miles Day; *Second Vice-President*, Alfred Stone; *Secretary and Treasurer*, Glenn Brown; *Board of Directors*, Robert S. Peabody, William B. Mundie, Isaac C. Ditmars; *Auditing Committee*, S. A. Treat, Wm. G. Preston.

The following were elected: *Fellows of the Institute*, W. R. Mead,

[1] The Committee had some correspondence in connection with the McKinley Memorial at Philadelphia and took the following stand in regard to the jury, the quotations being from personal letters from members of the Committee: "The experts should be decided upon and named in the programme. The character of these gentlemen will, in many cases, induce men to enter the competition or to refrain from doing so."

"It seems to me in every way desirable that the jury should be selected and named in the programme. For such a competition, especially where the jury are to have the assistance of another committee, three seem to me better than five, and as a mere suggestion I would say they should be, one a sculptor, one an architect familiar with monumental work, and one a landscape-architect or an architect familiar with landscape work."

an eight-horsepower motor, which gives normally 2,000 revolutions a minute. The motor is well covered, so as to prevent all penetration of water, and a continuous current of 525 volts can be applied. Above are two bobbins: On one is wound the wire upon which the current is received, the extremity being exposed in such a manner as to allow connection with a hook suspended from the tram or electric-light wire; on the other bobbin is wound the return wire, the free end being connected with a cast-iron block to be fastened to one of the tramway-rails. There is beneath the covering a compartment containing two circuit-breakers, a circuit-closer, and a commutator. To start the apparatus, it is only necessary, after connecting the two wires to the line giving the energy, to close the circuit and start it running slowly with the rheostatic guide; the guide being fastened to the circuit-breaker the motor runs normally. The time necessary for starting is about a minute. The bobbins on which are wound the conductors can receive 200 metres (656.167 feet) of insulated wire; if to this are added the 200 metres of hose on the reel and the thirty-five metres (114.83 feet) to which the water can be thrown, it is seen that a distance of 435 metres (1,427.16 feet) can be covered. The distance that the water can be thrown, nearly 115 feet, is accomplished with an orifice of 18 millimetres (.7 inch), and a volume of 350 litres (92.46 gallons) a minute. The whole machine can be placed on a hand-cart or on a little two-wheeled wagon drawn by one horse. Its total weight, with accessories and two men on the seat, is about 1,040 kilogrammes (2,292.78 pounds). The motor and pump are not longer than a metre (39.37 inches) and about one-half a metre (19.685 inches) wide and one-half a metre high. Behind the machine is a reel capable of holding 300 metres (984.25 feet) of hose, two lances, a ladder with hooks, an axe, a hydrant-key, a nozzle, etc. The weight of this reel, equipped, is 330 kilogrammes (727.518 pounds). The idea of this pump, which is the only one of its kind in France, if not in the world, was suggested to M. Robert Lefebvre, the captain of the Rouen Fire Company, by a conversation he had last year with a German engineer at the Berlin Fire Extinguishing Exposition. This latter had conceived the idea of an electric-pump for cleaning the walls of buildings, etc. If sand thrown by an electric-pump could clean buildings, why could not water thrown in the same manner extinguish fire? In the solution of this question, the electric fire-pump was born." — *N. Y. Evening Post.*

Sewage-disposal at Pittsfield, Mass. — About two years ago the authorities of Pittsfield, Mass., decided that some more advantageous method of disposing of the sewage than allowing it flow into the Housatonic River was necessary, and active measures were taken to install a more hygienic system. The sewage is now pumped a distance of two miles and a half from the outskirts of the city to large filter-beds, where it trickles through the filtering-material, consisting of sand, to underdrains, and thus is discharged, clarified, into the river. The pumping-station, by means of which the operation is performed, is believed to be the first electrically driven pumping-station for sewage-disposal in this country. According to the *Electrical World and Engineer*, the pump is especially designed for this class of work. The valves are of the clapper type, leather-seated and are free from any possibility of becoming clogged. The pump is triple-acting, and has a capacity of 2,000,000 gallons in ten hours, delivering at a pressure of seventeen pounds per square inch, the lift to the filter-beds being about 54 feet. The pumping-plant is operated only during the daytime, and to provide for the disposal of sewage during the time it is not in operation large storage reservoirs of some 1,500,000 gallons' capacity have been built underground between the pumping-station and the screen-house in the rear. These reservoirs are three in number, and are roofed with brick arches. To prevent any offensive odor from escaping from the reservoir, ducts are provided for carrying all gases, etc., to the base of the chimney on the power-station. Should the draught of this chimney be insufficient to carry off such vapors as may arise, a rotary-fan has been placed at the base of the chimney to assist in the ventilation. This fan is not yet in operation, but as it is to work both day and night, and as the circuit to the pumping-station is cut off at the central lighting-station when the pumps are not in operation, it is probable that a water-motor will be used for running the fan. A complete system of hot-water heating, with radiators, has been installed. — *Fire and Water.*

The Use of Petroleum in making Pig-iron. — Two Russian engineers, named Pitersky and Ivanoff, have devised a process by which petroleum can be utilized in the production of pig-iron in connection with a certain quantity of solid fuel. In a paper read before the Baku Technical Society, the following description of the process was given: The solid fuel is placed in a special generator, into the lower part of which are introduced the heated gases from the combustion of petroleum. The fuel, charged from above, gradually falls to the bottom and becomes heated; dry distillation results, and the gaseous products are drawn off from the upper part of the generator and utilized for fuel, while the resulting coke continues to descend. The products of combustion entering the lower part of the generator pass over the incandescent coke, are deoxidized, and are thus available as reducing agents, which can afterward be used in the second furnace. This furnace, which is used for producing iron, resembles an ordinary blast-furnace, from which it merely differs in having a tube running down the centre. The ore and fluxes are placed in the circular space between the walls of the furnace and the central tube, the latter being charged with a quantity of coal sufficient to supply the iron with the required equivalent of carbon for converting it into pig-iron, also, if necessary, with fluxes for changing the composition of the slags. The circular space and the central tube are provided with covers to retain the gases. The heated reducing gases from furnace No. 1 are made to enter the lower part of furnace No. 2 through several openings. The gases at first melt the ore and slag. In ascending, without changing their composition, they convey their heat to the materials, and they begin to act chemically, by reducing the iron-oxides, absorbing their oxygen, and becoming converted into carbonic-acid. Although the gaseous medium gradually acquires pronounced acid properties, the effect of the carbonic-acid is counteracted by the fall in the temperature. The spent gases collecting in the upper part of the furnace are utilized as fuel, the reduction process being preferably carried out by means of carbonic-oxide. The central tube terminates at the place where a temperature of 900 degrees Cent. prevails. The atmospheric medium at this horizon being of a reduced nature, the carbon dropping into the charge could only be utilized in combining with the iron to form pig-iron. The pig-iron and slags produced are tapped in the usual manner. The molten pig-iron from furnace No. 2 is run into the Bessemer converter. The pig-iron is converted into steel; the gases are led into generator No. 1 and serve for producing pig-iron in furnace No. 2. — *Iron Age.*

Jokes in Bricks and Brass. — In the year 1679 the Danes made a descent on Hamburg, then, as now, the great seaport of the German Confederacy. But the good people of Hamburg had had warning of the contemplated attack. They were ready, and the Danish soldiers met with so hot a reception that they were only too glad to take a hurried departure, leaving many of their number dead and dying behind them as a result of the conflict. The Hamburgers struck a coin to commemorate the event, and one of these coins has lately been sold among a collection which belonged to a deceased collector in Berlin. On one side are these words: "The King of Denmark has been to Hamburg. If thou wouldst know what he achieved, look on the other side." You turn the coin over, and the other side is — a blank! There are more than one of these historic jokes to be seen in various parts of the world. A notable one is a monument in the market-place at Coblentz. When Napoleon's conquering army marched through this city on its way to crush Russia, a French general erected this monument to celebrate this victorious progress, and on it carved an inscription setting forth the fact that Coblentz had been added to the French Empire, and signed with his own name. A few months later and a Russian general entered the town, but in pursuit of broken regiments of starving Frenchmen. He saw the monument and read the grand inscription. He did not blot it out, but, with grim irony, he carved beneath it, "Seen and approved by me," and he added his name. So the words remain to this day. There is a curious old almshouse in the Herefordshire town of Leominster. On the outside wall is a rude carving of a man armed with a heavy hatchet. Underneath are these words: "He who gives away all before he is dead, let him take up this hatchet and chop off his head." A former inhabitant of the town was the builder of these almshouses, and so charitable was he that at the age of about sixty he found himself penniless. He ended his days in the very almshouse he himself had built, and before he died requested that this amusing warning might be inscribed for the benefit of posterity. — *Answers.*

Bamboo. — The increasing importation of bamboo seems to indicate that Americans are beginning to appreciate the exceeding utility of that remarkable plant. In the Orient it fills so large a place that it may be compared with iron and steel in the Occident. When dried and cut into slivers it makes nails which never rust. These bamboo nails have recently appeared in a Broadway shop as souvenirs. When a portion of its surface is removed, steamed or heated in a fire, it becomes pliable, and may be bent into various angles. These two properties enable the Eastern cabinet-maker to manufacture it into stools, chairs, tables, screens, étagères, trunks and armoires. In the United States bamboo and rattan are made into ornamental furniture on a small and delicate scale, but the use of the large-sized bamboo for massive and durable furniture has not yet been attempted. Builders in the cities on the eastern coast of Asia use the bamboo for masts, poles, ladders, step-ladders, scaffoldings, painters' stagings, and other purposes where both strength and rigidity are demanded. With equal weights, bamboo is five times as strong as wood, and with equal strength is but one-third as heavy. The joints in the stems enable a workman to lash two poles together without any possibility of slipping, which is not the case with ordinary timber poles. This does away with the necessity of nails, and so increases the life of scaffoldings indefinitely. Every bamboo is practically a series of air-chambers. A boat-hook whose shaft is one of these stems is a life-preserver which will support one or two persons; while a bamboo gaff or boom will keep a dozen persons afloat. In household furnishing and decorations the Eastern reed offers unlimited variety. Thus far it has been employed in this country for picture-frames, easels, fancy chairs, and curtain-poles. In the Orient the larger sizes, which range from 3 to 12 inches in diameter, are sawed into various lengths and used for card-receivers, sugar-bowls, cigar-boxes, hand-trays, spoon-holders, umbrella-stands, drinking-utensils and jewelry-boxes. The larger ones are cut through and sawed with scroll-saws into various patterns, which are utilized as jardinières or the holders of pewter boxes, incense-cases and mantel-ornaments. When softened by hot water and split into thin strips these can be woven with cord into veranda and window shades, door-mats, and hall-mattings. When split still finer the strips can be braided into table-mats, chair seats and backs, dado wall-covers and a floor-covering which is almost indestructible. — *N. Y. Evening Post.*

Waterfall near Chihuahua, Mexico. — William P. Dunham, a prominent Denver mining-man, has returned from Mexico recently. In addition to a tale of the vast mineral wealth of the Mexico district, Mr. Dunham also has a story of a wonderful waterfall, which probably enjoys the distinction of being the highest waterfall in the world. The fall is known by the Indian name of Basaseachic, and is located about 190 miles west of the city of Chihuahua, near the summit of the Sierra Madre Mountains. The elevation of the mountain is 6,500 feet above sea-level. The cascade falls 978 feet. — *N. Y. Tribune.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

of marked unity of style. The Argive school of sculpture, from which came Miron, Phidias and Polycletus, pupils of one master, Agelidas, was the nursery of the Attic. Dr. Waldstein, with that skill in comparative study that distinguishes him, has collated these remains with the recognized works of Polycletus, discovering in them personal characteristics which mark them all as the work of a single school, if not of a single hand, which he holds to be the hand of Polycletus himself. He finds it necessary to revise the current estimate of Polycletus, and even his own, being convinced that this sculptor was "the most purely Classic artist of antiquity," and adding: "Polycletus is the sculptor of beauty, as Phidias is sculptor of sublimity, Praxiteles of grace and pure Greek sentiment, and the Bergamenians and Rhodians of action." The whole of Dr. Waldstein's essay is an interesting lesson to those who would know what the comparative study of art means.

In mechanical execution the book is of the best, a handsome folio, not intolerably big. The illustrations are not only technically excellent, but full of charm. Photogravures show well the delicate beauty of the sculptures: admirable half-tones set forth the views, the pictures of the lesser finds, and the skilful drawings in which Mr. Tilton embodies his courageous restorations. — *W. P. P. L. in the Boston Transcript.*

BOOKS AND PAPERS

THE D. Van Nostrand Company publishes in this country a translation of Paul Charpentier's book on timber,[1] which will find a welcome among the multitude of persons in this country who have begun to interest themselves in the production and use of timber. M. Charpentier begins at the beginning with his work, furnishing, after a botanical survey of the subject, some excellent chapters on sylviculture, clearing and replanting, and the exploitation of forests, followed by others on the allied subjects of the drying, seasoning and preservation of timber, and its protection from insects and diseases. To these are added some valuable chapters on the accessory products of forest exploitation, and methods of staining wood, and of utilizing timber wastes. As may be supposed, the book does not pretend to be a treatise on carpentry, or even on the strength of timber, but takes up wood as a substance, showing how it grows; what are its different varieties, their properties and the places where they are found; the methods of converting the different species into useful products, and the purposes to which these products are applied. Nothing just like this has, so far as we know, been done in English for many years; and scientific forestry, as well as the scientific utilization of timber, is so recent a study, that the ancient text-books are of very little use. It would be too much to say that M. Charpentier's work is everything that the American student can desire. Too little is said about American timber trees, and what is said about European timber is not always perfectly clear, as where we are informed that, out of a total annual consumption of twelve million cubic metres of Norwegian timber, ten million cubic metres are used for "household requirements and cultivation of land," and only a million and a half for firewood and building purposes; but it is, at least, comprehensive and most modern, and its defects can easily be overlooked for the sake of its merits. It is due to the translator, also, to say that much of the value of the book in its English form is due to the skill and care with which he has done his work. A more difficult treatise to translate well it would not be easy to find, but Mr. Kennell has accomplished his task with great intelligence, and with a smoothness which is gratifying to the reader.

WHAT Professor Carpenter's book on the heating and ventilation of buildings[2] should have passed through four editions in seven years is sufficient evidence of its value, and the fourth edition, which has been in great part rewritten, and increased in size about one-third, is more valuable than ever. The chapters which are entirely new relate to the mechanical systems of heating and ventilation which are now so justly in favor; to fans and blowers, and to school-house heating and ventilation; and these will be found particularly valuable to architects, whose most serious problems of the kind most often present themselves in connection with the heating and ventilation of school-houses by means of fans. A few years ago, the architect could shift all the responsibility for the designing of such an apparatus on the contractor, but that time has gone by, and the architect of a large school-house or public building, even if he relies upon a contractor, or a consulting expert, for details, must know approximately the sizes of pipe and ducts that will be needed, the extent and position of radiating surfaces, the dimensions of the boiler, and the necessary size of the chimney; and he is expected also to be able to give advice as to the kind of boiler to be used; to know when steam or grease traps will be necessary, and where they should be placed; to understand the relative advantages and disadvantages of horizontal and vertical engines, and to judge where inlet and outlet registers should be placed, and how much, if any, direct radiation should be introduced for night-work. If he is ignorant of these matters, his building cannot be economically and conveniently designed; and it is not too much to require of an architect at least sufficient knowledge to enable him to plan his building in such a way that it will not have to be altered subsequently to get in the necessary apparatus. As a resource in matters of this kind Professor Carpenter's book can hardly be too highly praised. The rules and tables which it gives for ascertaining the sizes of pipes, conduits and flues, radiators and registers, are not only reliable, but easily understood and applied, and invaluable descriptions are given of nearly all the recent devices, in the shape of improved boilers, temperature-regulators, fans and blowers, and electrical heating-apparatus, which the architect is likely to meet with, and in regard to which it is peculiarly necessary that he should be able to refer to the judgment of an expert, instead of depending upon the reckless and ignorant laudation, if not monstrous misrepresentation, which the travelling agents of the patentee often see fit to offer him. As every architect knows, the business of heating and ventilation is infested with the loquacious vendors of patent grate-bars, by the use of which sixteen pounds of water can be evaporated by burning one pound of coal; of powerful ventilators, consisting of a three-quarter-inch pipe, with one end inserted in the kitchen range, which will keep the atmosphere of a house as fresh and balmy as a June morning; of infallible grease-extractors, smoke-consumers and other devices, recommended by an imposing list of patrons, whose names are, in some cases, either forged or fictitious, but in regard to the merits of which the architect is often unable to judge accurately for himself. Where Professor Carpenter's book does not treat specifically of the appliance in regard to which information is sought, he generally gives principles which will enable an intelligent architect to form an opinion for himself in accordance with which he can conscientiously advise his client, and the latter, who expects the architect to know all about such matters, is always pleased to find that he was not mistaken in his anticipations.

[1] "*Timber.*" A Comprehensive Study of Wood in all its Aspects, Commercial and Botanical. Translated from the French of Paul Charpentier by Joseph Kennell. London: Scott, Greenwood & Co. New York: D. Van Nostrand Co. 1902. Price $6 00 net.

[2] "*Heating and Ventilating Buildings.*" A Manual for Heating Engineers and Architects. By Rollo C. Carpenter, Professor Experimental Engineering, Cornell University. Fourth Edition, Revised and Enlarged. New York: John Wiley & Sons. 1902.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

CHAPEL OF THE TROY ORPHAN ASYLUM, TROY, N. Y. MESSRS. WARREN, SMITH & BISCOE, ARCHITECTS, BOSTON, MASS.

A CITY RESIDENCE, NEW YORK, N. Y. MESSRS. ROBERTSON & POTTER, ARCHITECTS, NEW YORK, N. Y.

CHURCH AND PARISH HOUSE FOR ST. MARK'S PARISH, PATERSON, N. J. MESSRS. H. M. CONGDON & SON, ARCHITECTS, NEW YORK, N. Y.

STABLE FOR THE STANDARD COACH-HORSE CO., 41–43 WEST 63D ST., NEW YORK, N. Y. MESSRS. LUDLOW & VALENTINE, ARCHITECTS, NEW YORK, N. Y.

Additional Illustrations in the International Edition.

THE WOMAN'S CLUB-HOUSE, WORCESTER, MASS. MISS JOSEPHINE W. CHAPMAN, ARCHITECT, BOSTON, MASS.

HOUSE OF MRS. WIRT DEXTER, NO. 393 COMMONWEALTH AVE., BOSTON, MASS. MESSRS. LITTLE & BROWNE, ARCHITECTS, BOSTON, MASS.

THIS and the following subjects are copied from Baron Taylor's "*Voyages pittoresques.*"

THE CHÂTEAU DE JOSSELIN, BRITTANY, FRANCE.

BEDCHAMBER OF FRANCOISE DE FOIX, CHATEAUBRIAND, BRITTANY, FRANCE.

INTERIOR OF THE COLLEGIATE CHURCH, NANTES, BRITTANY, FRANCE.

NOTES AND CLIPPINGS

ELECTRIC FIRE-PUMP IN ROUEN. — Thornwell Haynes, United States Consul at Rouen, gives the following description of an electrical fire-pump used in that city: "It is composed of a centrifugal-pump, and

In the scheme for the development of the Mall, the plans contemplate along B Street, North, and B Street, South, a series of white marble buildings to be devoted to the scientific purposes of the Government, including the museums most frequented by vis tors to the capital. Such buildings so placed would give great dignity as well as continuity to the approach reciprocally to the Capitol and to the White House. Under the provisions of an Act of Congress, plans have been prepared by Messrs. Lord & Hewlett for a new Agricultural Department building, and the appropriation for the structure is confidently expected at the present session. The competition was conducted with the assistance of the Park Commission, and if the building shall be erected as planned, a pace will be set for the series on the south side of the Mall. Congress has provided also for plans for a new building to relieve the overcrowded National Museum, and these plans are now being prepared by Messrs. Hornblower & Marshall. Unfortunately, it is now contemplated that this building shall be of brick and terra-cotta. In case this idea shall prevail, the series on the northern side of the Mall (where the new building is to stand) will begin with a serious handicap. The problem now is to make it apparent to Congress that a great and important museum-building should have a character of its own in keeping with the treasures displayed within its walls and worthy of the Government it represents. Those who have immediate charge of the work are fully alive to the situation.

As is well known, the Commission's plans contemplate the purchase of the squares south of Pennsylvania Avenue from the Treasury to the Capitol, and the erection thereon of public or quasi-public buildings, among them a municipal building for the District of Columbia. The ideal location for the District-building is the site now occupied by Centre Market; but the importunate condition of the District in respect to a public building was such as to lead Congress to order the purchase of the square between Thirteen-and-a-half and Fourteenth Streets, and the competitive plans for the new structure will be exhibited to the members of the Institute at this meeting. Thus, while a departure is made from the exact site, the adherence to the general scheme is most gratifying.

In this connection it is worthy of record that the Daughters of the American Revolution, moved by a desire to aid in the park improvements and actuated also by a sense of future advantage to their own cause, have purchased as a site for their Continental Hall, Square 173, the second square south of the Corcoran Gallery of Art. This location, facing the White Lot, is certain to become a most desirable site for a semi-public building. It is to be hoped that other societies will acquire the two lots remaining, and that due regard will be had for architectural effect, so as to secure harmony among the buildings framing this portion of the park system.

An important, even an essential, feature of the park plan is the reclamation of the flats of the Anacostia, or eastern branch of the Potomac River, a project divided as to its cost. The improvement of the lower stretch of the river belongs to the National Government proper; and the Army engineers have long had plans for dredging the stream and depositing the soil behind channel-walls of stone. The recent River and Harbor Act carries an initial appropriation of $150,000 for this portion of the work, and contracts are now in process of award. Along the upper stretches of the river the improvement is a District of Columbia matter. The Commission recommended as at once the least expensive and the most effective treatment the creation of a water-park, the waters being held back by a dam and islands being created by dredging, as the topography permits. Until the titles to the property to be submerged and otherwise used shall have been established it will not be possible to go on with this portion of the plan.

Congress, however, has already taken steps to have the question of titles settled; and such is the urgent nature of the improvement from a sanitary standpoint that it cannot long be delayed.

The Senate Committee on the District of Columbia in its report calls attention to the fact that the plans of the Park Commission were the resultant of two coincident movements; one, technical in character, being the action of the American Institute of Architects at its annual meeting two years ago; the other a popular movement for the embellishment of the national capital, set on foot at the time of the celebration of the one hundredth anniversary of the removal of the seat of government to the District of Columbia. Among the objects proposed at that celebration was the restoration of the White House as the residence of the President of the United States, a project the imperative nature of which was already recognized by Congress. By reason of a most fortunate chain of circumstances a President alive to the importance of having the work done in the most thorough and artistic manner came to be entrusted with the task. It is in no way invidious to say that if the selection of an architect for this delicate undertaking had been left to this body the choice would have been the man whom President Roosevelt did select — the President of the Institute of American Architects. How well he has carried out the work, with what thorough respect for the traditions of the house, with what comprehensive knowledge of the universal language of his profession, with what noble self-restraint he has subordinated decoration to architecture, and with what modesty he has made the old mansion speak its own speech and not that of an individual architect — all these things you may see for yourselves.

The importance of the work on the White House by way of teaching the highest lessons of dignity, restraint and historic tradition, coming, as it does, at the very beginning of what we fondly hope is a new era in Washington, cannot be overestimated. To link the age that is past with the age that is waiting before has been the constant endeavor of the Park Commission; and the restoration of the White House affords a supreme example of such continuity.

Thus briefly and imperfectly I have sketched for your encouragement the progress of plans as yet scarcely a year old. In this connection I cannot forbear to advert to the fact that the one man in Congress with whom the work of restoring the L'Enfant plan and carrying it to its ultimate conclusion through the plans of the Park Commission was a passion has passed from the scene of endeavor. Suddenly, unexpectedly, at the moment of highest usefulness and promise, and just as he was beginning to see the fulfilment of plans and purposes pursued through thirteen years of strenuous and intelligent effort, Senator MacMillan's career on earth was terminated. It had been his expectation to press upon the attention of Congress at this session a combination of all the scattered authorities over District parks and reservations, and to create a single body capable of employing experts to perfect the details and to carry out thoroughly and vigorously the comprehensive scheme of the Park Commission. That task now devolves upon others; and it should be the duty of the members of the American Institute of Architects to exert their constant and determined influence towards the creation of such a board of control. By so doing they will complete a task to which they have already set their hands and, as I believe, their hearts also.

THE ARGIVE HERÆUM.

THE excavation of the Heræum of Argos for the American Institute of Archæology and the American School at Athens under Dr. Waldstein, whose eminent services to classical archæology are known to a great part of the readers of the *Transcript*, is the most considerable exploration of its kind that our countrymen have accomplished, and only next in value to the work done at Olympia by the German Government and at Delphi by the French School. It is a special cause for congratulation, because in this country such work gets no help from public funds, and must be carried through with self-denying effort by institutions whose means are small, and by private subscription. The first volume of the report has just been published by Houghton, Mifflin & Co., introduced by Dr. Waldstein's general sketch of the excavations, and containing detailed notices of the work of the American expedition in its several departments.

What makes Olympia, Delphi and the Argive Heræum interesting to study more than other places in Greece is that Greek art as much as Gothic centred in worship. All the arts, architectural, plastic and decorative, were lavished on temples and shrines. The fact that the Heræum was held for 2,000 years in paramount sanctity attracted to it a great accumulation of offerings such as in classical Greece and later in Christendom made the wealth and splendor of favorite shrines. In after centuries it was forgotten and its identity lost. In 1831 the site was first rediscovered by an English officer, General Gordon, who verified it by tentative excavation. More than twenty years later the Greek scholar and poet Rangabé made some further examination, imperfect, and soon given up for want of funds.

It was not till 1892 that, under the direction of Dr. Waldstein, excavation was undertaken there by American archæologists with the thoroughness and orderly method of modern scholarship. The volume now published contains, besides Dr. Waldstein's interesting notice of these excavations, a detailed account of the architecture of the Heræum by Mr. Edward L. Wilson, of its sculpture by Dr. Waldstein, its inscriptions by Mr. R. B. Robinson and Professor Wheeler, and a sketch of the geology of the plain and hills of Argolis by Dr. H. S. Washington. Vases, bronzes, and some other important subjects are left to be discussed in the second volume.

The commanding situation of the Heræum on a height at the head of the plain of Argolis made it a midway station for the three great Argive cities, Tiryns, Mycenæ and Argos. It survived them all, maintaining its religious preëminence for 2,000 years, down to the end of the classic period. Though every part of this long life has left its memorials, the finds are unequally distributed in time. Of the smaller objects found almost all are of early date. Terra-cottas, vases, bronzes, gems, and the like present the primitive styles in a multitude of examples; but of the classic period there are very few. Yet the primitive objects found here, the vases especially, have a bearing on some important questions of the history of art that gives them peculiar interest. Dr. Waldstein believes that the publication of them will make it necessary to revise in some respects the classification of ancient vases.

In architecture, though there is a continuous series of remains coming down from the oldest temple, to which our explorers are inclined to assign the very early date of the nineteenth century B. C., and which was buried in 423 B. C., the building of which the most important and significant remains survive is the second temple. This was built immediately after the destruction of the first, in the high summer of Grecian art, dating, it is believed, between the Parthenon and the Erectheum. So of the sculpture, substantially all of which belonged to this temple, a great many fragments have been recovered. There are no whole statues, but many beautiful heads, several in singularly good preservation, some admirable torsos, one or two nearly complete figures from metopes, and a great number of smaller pieces, all of the best period, of exquisite workmanship, and

G. L. Heins, J. L. Mauran, Elmer Grey, Ralph Adams Cram; *Honorary Members:* Samuel A. B. Abbott, of Boston; Andrew Carnegie, of Pittsburgh; Emil Vaudremer, of Paris. *Corresponding Members:* George R. Shaw, of Boston; John Jas. Burnett, of Glasgow; Bannister F. Fletcher, of London; Mervin McCartney, of London; Leonard Stokes, of London; A. H. Bloomfield, of London, and Wm. M. R. French, of Chicago.

The city of Cleveland was chosen for the next Convention.

THE IMPROVEMENT OF WASHINGTON.[1]

A LITTLE less than a year ago, one of the most brilliant and most successful members of the American Institute of Architects came to Washington to see the models and drawings prepared under the direction of the Park Commission. He was on his way to Italy for needed rest, and also for study that would be helpful in his profession. At the time of his visit, the exhibition was being made ready at the Corcoran Gallery of Art, but enough pictures were on the walls to give a fair idea of the lines along which the Commission had worked. Six months later, this same architect, being again in the city, said: "That hasty and incomplete view I obtained of the work of the Park Commission made a radical difference in my visit to Europe. I had never before appreciated the relations between landscape and architecture. The park plans enabled me to see Italy and Paris with new eyes, and thereby added vastly to my enjoyment and benefit."

This instance is not exceptional. The park plans came at a time when architects all over the land were beginning to feel that it was their duty, and that it might also become their privilege, to consider not alone the individual client, but also the people as a body; and especially that public buildings should be so placed as to enhance the unity, the dignity and the beauty of the city. Years of abundance have piled up capital and interest is low; and it is now both possible and profitable to build not alone for the present generation, but also for posterity. The only element now needed to accomplish in the the United States results surpassingly great is a keen but friendly rivalry among cities to excel in civic beauty and dignity as well as in commerce and manufacture. Having secured the power to live, it now remains to cultivate the joy of living. This is to be attained by making beauty a part of the every-day life of all the citizens. To this end no one thing contributes more than beautiful buildings beautifully placed, and ample parks adapted to the refreshment of both the mind and the body. Unless the Washington Park plans shall point the way to the study and practice of civic beauty throughout the United States they will fail of their highest results. In this work the American Institute of Architects, which was so potent a factor in originating the Park Commission, has a duty to perform that is too obvious to need argument.

The models, pictures, maps and plans illustrating the work of the District of Columbia Park Commission were exhibited at the Corcoran Gallery of Art for six weeks beginning on January 15, 1902; and on the same day the preliminary reports of the Senate Committee on the District of Columbia and of the Park Commission were submitted to Congress by Senator McMillan. President Roosevelt and the members of his Cabinet were present at the opening of the exhibition; and, as opportunity has offered, the members of the Administration have given to the Commission and to the plans hearty, intelligent, effective, aid and support.

It was never for a moment the purpose of Senator McMillan to seek the formal approval of Congress for plans to produce which had required the experience and training of years and the intense and absorbing study of months on the part of men who had achieved the highest measure of success in their life-work. To understand the plans requires patient study, because they aim not only to satisfy the eye trained to the perception of beauty, but they also make a direct appeal to the intellect, by reason of their seasonableness and of the historic consciousness which they embody.

Questions of art and taste are not proper subjects for discussion by any deliberative body; and Congress is accustomed to refer such questions to committees or commissions and to accept or reject an individual project at the time when the question of making an appropriation for it comes up. Moreover, many portions of the plans do not need specific Congressional action, but may be carried out by the heads of one or other of the Executive Departments, by the Commissioners of the District of Columbia, the Secretary of the Smithsonian Institution, or the officer in charge of public buildings and grounds, provided the particular individual has taken the pains to inform himself as to the plans and is in sympathy with the project. Happily, thus far, only one officer of the Government has been found who is not both willing and anxious to carry out the plans of the Park Commission. The development of the Mall system substantially along the lines laid down by Peter Charles L'Enfant under the immediate direction and supervision of George Washington and Thomas Jefferson is, by common consent, the keystone in the arch. On this depends the future of the National Capital. If the plans for this portion of the work shall be carried out, then the city of Washington will become a consistent work of art, possessing unity, dignity and beauty. If the Mall plans fail, then Washington will remain a collection of unrelated units, and the greatest opportunity ever presented to the governors of a capital city will be ignorantly, ruthlessly, wantonly cast aside. It is easily within the possibilities that Washington may become more dignified, more beautiful, more consistent in plan than Paris; and yet with a great price Paris purchased unity and dignity, whereas to Washington it is a birthright, requiring only nurture and development.

As the improvement of the Mall is the key to the development of the Capital, so the removal of the railroad from the Mall is the condition precedent to any adequate development of that space.

What properly may be called the dynamic force of the plans prepared by the Park Commission, combined with the persuasive powers of the chairman of that body, is shown by the fact that a part of the report is a reasonable proposition on the part of the Pennsylvania Railroad Company not only to sacrifice its commercially strategic position in the Mall, but also to go to great expense in promoting the general scheme by erecting at a point selected by the Commission a union railway-station of such architectural character and so fitted and furnished as to be an adequate and suitable gateway to the Capital of the United States.

The proposed union station, in size longer than the Capitol by 8 feet and 8 inches, will not only accommodate the seven railroads now entering the District of Columbia, but also provision is made for the accommodation of any new road which may secure hereafter the right to construct its lines into the District; and the national character of the structure will be recognized both by the monumental character of the building itself and its location in relation to the Capitol, and also by certain arrangements within the structure whereby the President and guests of State will have separate and suitable accommodations when entering or leaving the city of Washington.

A bill to carry out these ideal arrangements having passed the Senate and having been reported to the House with the unanimous favorable recommendation of the Committee on the District of Columbia of that body, the successful outcome of this project before the 4th of March may be anticipated with confidence.

The main axis of the great composition designed by the Park Commission as the completion of the L'Enfant plan has for its beginning the Capitol and for its centre the Washington Monument. It is essential to the integrity of the composition that the western limit of the axis shall be marked by an object worthy to stand with the two great structures mentioned. This end once accomplished, the result must be a civic composition the greatest in extent known in the modern world. After mature consideration and after consultation with those in position to give advice on such a subject the Commission recommended that the main axis be a suitable memorial to the one man in our national history who by common consent shares preeminence with George Washington — to Abraham Lincoln.

This suggestion met a prompt response on the part of Congress; a Lincoln Memorial Commission was created and $25,000 appropriated to provide for the plans. The consultations already held give promise that the type of memorial proposed (a great portico in the Doric or the Corinthian order) and the location suggested by the Park Commission will be recommended to Congress. If these views shall be accepted, then the ultimate development of the space from the Monument westward to the Potomac, an area a mile in length, must proceed according to the plans of the Commission.

On the west front of the Capitol grounds the Commission have laid out Union Square, as they have named it, a space resembling the Place de la Concorde in Paris; and this area they would adorn with statues of Grant and his two great lieutenants, Sherman and Sheridan. The Grant statue, or memorial, has been provided for, and it is within the power of the statue commission to locate it in the space recommended by the Park Commission. There is reason to believe that this location will be the one selected, and thus another stake will be driven. The location of Sheridan on Grant's left should follow without question, since no action on that project has been taken. Nor should there be great difficulty in changing the location of the still uncompleted statue of Sherman to a site on Grant's right. The present location on the axis of the Treasury is the culmination of the long series of blunders and misfortunes that have attended this statue from its inception. No comic opera contains a more absurd conceit than the position gravely maintained in connection with the Sherman statue; namely, that on the death of the artist a commission to execute a work of art becomes an asset of his estate, to be traded on by the heirs as their art knowledge, or lack of it, may dictate and the funds at their disposal may permit. Added to this absurdity is the location of the statue of William Tecumsch Sherman in John Sherman's rightful place. It is quite unnecessary to discuss the pedestal that has been prepared for the Sherman statue. It speaks for itself most loudly. It is to be hoped that the whole business will prove an awful and an effective warning.

Turning now to a pleasanter theme: the proposed union station has been adverted to as the gateway of Washington. There is a gateway by water as well as by land. Where the Anacostia joins the Potomac is the long, narrow space, beautiful for situation, known as the Washington Barracks; and there Congress has provided for the construction of the Army War College and the School of Application for the Corps of Engineers.

The main college building, with its formal gardens, will look down the Potomac to the old town of Alexandria, rich in Colonial memories, and on towards Mount Vernon, the extreme southeastern limit of the proposed park system. The officers' quarters flanking the parade grounds will present along the river front a series of porticos, with their line of white columns standing in order like a regiment on dress-parade. This work is now being carried out according to plans eminently satisfactory to the Commission.

[1] A paper by Charles Moore, Secretary of the Senate Committee on the District of Columbia.